

Railway Age Gazette

PUBLISHED EVERY FRIDAY AND DAILY EIGHT TIMES IN JUNE, BY THE
SIMMONS-BOARDMAN PUBLISHING COMPANY,
WOOLWORTH BUILDING, NEW YORK.

CHICAGO: Transportation Bldg. CLEVELAND: Citizens' Bldg.
LONDON: Queen Anne's Chambers, Westminster.

E. A. SIMMONS, President.
L. B. SHERMAN, Vice-President. HENRY LEE, Sec'y & Treas.
The address of the company is the address of the officers.

EDITORS.

SAMUEL O. DUNN, Editor.

ROY V. WRIGHT, Managing Editor.	H. H. SIMMONS	E. S. FAUST
W. E. HOOPER	H. F. LANE	F. W. KRAEGER
R. B. ADAMS	E. A. AVERILL	A. D. CLOUD
E. T. HOWSON	R. E. THAYER	GEORGE L. FOWLER
	A. C. LOUDON	

Subscriptions, including 52 regular weekly issues and special daily editions published from time to time in New York, or in places other than New York, payable in advance and postage free:

United States and Mexico.....	\$5.00
Canada.....	6.00
Foreign Countries (excepting daily editions).....	8.00
Single Copies.....	15 cents each

Engineering and Maintenance of Way Edition and four Maintenance of Way Convention Daily issues, North America, \$1.00; foreign, \$2.00.

Entered at the Post Office at New York, N. Y., as mail matter of the second class.

WE GUARANTEE, that of this issue 8,300 copies were printed; that of these 8,300 copies, 8,612 were mailed to regular paid subscribers and 350 were provided for counter and news companies' sales; that the total copies printed this year to date were 396,509—an average of 8,619 copies a week.

VOLUME 55.

NOVEMBER 14, 1913.

NUMBER 20.

CONTENTS

EDITORIAL:

Editorial Notes	897
Locomotive Runners Who Know Their Business.....	898
Overhead Inspection of Box Cars.....	898
Increases in Wages and in the Cost of Living.....	899
Movement of Wages, Prices and Railway Rates.....	899
New Books	900

MISCELLANEOUS:

Rules for Keeping a Lookout on a Busy Road; by Edward F. McKenzie	901
The Wrought Steel Wheel; by D. F. Crawford.....	902
*Summit-Hallstead Cut-Off of D. L. & W.....	903
Eastern Trainmen's Wages Settled.....	909
*W. C. Nixon and the Frisco.....	914
Overloading Freight Locomotives Not Economical; by J. S. Sheafe.....	915
*Gas-Electric Locomotive	916
Mr. Mellen Speaks Out.....	918
Movement of Prices and Railway Rates; by M. Clement Colson.....	919
*Constant Voltage Axle Lighting System.....	923
Refunding Overcharges in Oklahoma.....	924
Foreign Railway Notes	908, 913, 914, 917, 924

GENERAL NEWS SECTION

*Illustrated.

THE award of the arbitrators in the matter of the wages of the conductors and brakemen on the "Eastern" railroads has the merit of being easily understood. It is a very well-written document. The more important reasons for the award are clearly stated, and the verdict of the public will not have to be, as so commonly in the past, "they just split the difference." An average increase of 7 per cent. has been granted, almost wholly because the cost of living has increased. Messrs. Atterbury and Smith in their dissenting opinion declared that the highest figure sustained by the evidence as to cost of living is 5.36; and on this ground they protest. Messrs. Low and Finley, the neutral arbitrators, evidently took into consideration factors concerning cost of living not definitely shown in the evidence, yet of

appreciable weight. The company arbitrators protest that the men were already liberally paid; but both sides agreed as to the propriety of not considering conditions prior to 1910, the year of the last previous award; and, as everybody knows, the present big pay dates from that year. In other words, for any injustice now imposed on them the companies must put the chief blame, not on the present arbitrators, but on what was done in 1910. On the question of standardization of the rates of pay throughout the whole country, the report contains some fine-sounding words about uniformity in the government service, and the logical relation between government service and railway service; but the decision practically admits Messrs. Atterbury and Smith's view that the idea is chimerical. These dissenters show a possible weakness in Messrs. Low and Finley's opinion that standardization as between the East and the South has now been attained. The claims of the men concerning increased risk and their greater responsibility; and as to their share in alleged increased profits, are shown to be exceedingly weak, even groundless. The demands for time and one half for (a) double-head trains and (b) for overtime, were rejected. The first of these is utterly unreasonable and the second nearly as bad. This whole subject of overtime demands further and full discussion. The neutral arbitrators did not have time to master it. They did, however, declare in plain language that in train service punitive overtime is wrong in principle. On the whole it may be said that the neutral arbitrators, who decided everything, have given the employees the 7 per cent., and nothing more. The employees' other claims are all shown to be unreasonable. The roads' claim that the pay is now good is likewise rejected quite summarily; "not proved."

THE season for the beginning of Christmas shopping is now open. It is, therefore, once more an opportune time to remind our readers in the railway and railway supply businesses that nowadays they live, work and have their being in the spotlight of publicity. This being true, it behooves them to avoid both evil and the appearance of evil. Sometimes there is real evil in the giving of Christmas presents when the donor is a man who is seeking to get contracts and the recipient is the man from whom he is trying to get them. Sometimes there is no evil in it. Seldom, however, do presents of substantial value pass between a representative of a supply concern and an officer, whether high or low, of a railway without the incident presenting at least the appearance of evil. Such gift-giving and gift-receiving, if not open to just censure, is clearly open to a construction which is adapted to do both the railways and the supply concerns harm. Last year and the year before at about this time the *Railway Age Gazette* warned against the dangers incidental to the extensive practice of present-giving which has grown up in the railway and railway supply businesses. It is believed that our comments on the subject and those which others have made, have done some good. They have not, however, had the effect of abolishing the practice. What is still worse, all the discussions of, and the scandals connected with various forms of grafting have not been sufficient to eliminate it from the railway business. There are numerous forms of stupidity. The most bone-headed form of it, however, is the stupidity of dishonesty. No man is so hard to convince that he should desist from doing things that he is doing as the man who is making a dishonest profit from doing those things. His stupidity almost always leads him to believe that he, at least, is shrewd enough to prevent his conduct from being detected and exposed. The experience of others who have been detected, exposed and disgraced for doing just as he is doing usually is lost upon him. It would seem, however, that the many, many developments which have occurred in the railway business within the last decade, and especially within the last half decade—should have taught every man who is connected with that business or who has business relations with it, that the time has come when it behooves him to put his house in order so that

when the muckrakers for the magazines, or the inspectors of the Interstate Commerce Commission, or the lawyers for the Interstate Commerce Commission, swoop down on him they will not find anything which he would not like to have them find.

LOCOMOTIVE RUNNERS WHO KNOW THEIR BUSINESS.

THE prize essay on keeping a lookout on the locomotive, one of a large bunch of excellent papers on this subject received in response to the offer which was published in our issue of August 15, is by Edward F. McKenzie, and is printed on another page. It comes from one of the prize railroad divisions of the country, the Pittsburgh division of the Pennsylvania.

Considering the elaborate block signal equipment of the Pittsburgh division there may be readers to whom it will occur that Mr. McKenzie's problem may in some respects be less difficult than that of an engineman on a road of thinner traffic and not so favorably situated; but these are reminded that there will be other excellent papers, in later issues, from runners in other parts of the country.

A reading of all these papers gives one a high opinion of American enginemen, and it is a matter of much regret that only a part of the very good material that has been received can be used. Those writers who have sent papers full of excellent ideas, but who have not taken the prize, are reminded that the competition was very close. The prize was for a paper dealing with the single question of the lookout; but we shall print a number of papers which deal with the engineman's duties in a more general way.

To readers not familiar with train-running it is perhaps proper to offer the reminder that Mr. McKenzie's statement that there are 1,200 signals between Pittsburgh and Altoona does not mean that a hundred miles of line is divided into sections a twelfth of a mile in length. With such short sections, the engineman of a fast train would have to be watching for a new signal every five seconds, continuously, for an hour and a half or longer. What Mr. McKenzie means is that there are 1,200 signals, every one of which the engineman must know the meaning of. The shortest block sections are 4,200 ft. long. For a given trip, the duty of the engineman of a fast train, as regards the signals, is to watch for one signal at the approach to each block section, and then, next, one immediately at the entrance to that section. And this one signal that calls for his attention is the one easiest to pick out; it is the top signal (if there be more than one on a single post) on the post for the track on which he is running, and the post is either exactly above that track (on a bridge) or immediately to the right. And every approach signal is set far enough back from the entrance to the block section to allow space in which to stop the train after the engine passes the signal (in case a stop is necessary), so that there is no trouble because of fogs or snow storms which might prevent the runner from seeing the signal until he got close to it; and the less familiar signals do not have to be dealt with at high speeds.

This explanation is made here, not to impair the force of Mr. McKenzie's statements, but to make sure that they shall be looked at in the right way. The Pittsburgh division is well signaled, but that does not detract from the credit due the enginemen. No runner who has given satisfactory service on that division for five years can be other than a very competent engineer.

Next week, or in the near future, a number of other papers will be printed. These will give the reader interesting pictures of the locomotive engineer's life in all parts of the country. The writers have not only described their work in a very entertaining way, but all of them have served in the cab for many years, and they have thrown in enough of their experiences to give their narratives a decidedly "human interest."

OVERHEAD INSPECTION OF BOX CARS.

THE need of standard practice in the overhead inspection of box cars has become more of a necessity than ever since the Freight Claim Association agreed upon the apportionment between railways of claims for loss and damage to freight caused by defective cars not properly inspected. Under the new rule that went into effect the first of last September the loading carrier is to be held liable for the condition of the car in which the freight is loaded, and will be charged for such damage as may occur on account of defects not repaired before loading. With definite rules for all roads to follow there will be less chance for misunderstandings, and should be more uniform and better service to shippers, the latter being of paramount importance.

The originating road can no longer offer cars to shippers that are unsatisfactory for their merchandise without being held for the loss or damage that may occur to that shipment on account of the original defects of the car. It is therefore of no advantage to offer such a car for the shipper to accept or reject as he desires, inasmuch as the shipper may be compelled to use the defective car on account of the stress of business. It is erroneous to assume that a shipper would load such a car from "malice aforethought," as it is to his interest to have his products reach his customer in the best possible condition. In order to obtain the best possible results the inspection should be carried back from the point of delivery to the shops, where a rigid inspection should be made for leaky roofs, projecting bolts, protruding nails, leaky doors, etc., even though these items were not scheduled for repairs. By doing this and making the necessary additional repairs much time and money will be saved, and a greater number of suitable cars will be available for special freight.

As regards the loading; while it is unquestionably the duty of the shipper to see that a car is loaded properly, it is also the duty of the carrier to see, when the load is transferred from one car to another during transit, that the freight is loaded in the same substantial way, and as well protected from possible injury as it was in the original car. In order to do this properly a certain amount of instruction must be given the freight handlers regarding the handling of the various commodities, and where contract labor is employed a system should be adopted for holding the contractors to account for the damage for which they are responsible. Adequate equipment should be installed at the places where trans-shipments are made, so that there can be no excuse for employing improper methods. In cases where cars become damaged in transit it is the duty of the carrier to make the necessary repairs immediately in order to protect the freight. Cars carrying different classes of freight require different degrees of care in inspection, and inspectors should be so instructed that the special requirements of each commodity will be met.

With fair and consistent co-operation between the carriers and the shippers, and between the carriers themselves, a great good can be accomplished. This co-operation, to obtain the best results, must, however, extend down to the humblest car repairer. With the slogan, "protect the freight," as well as the slogan, "keep the cars moving," constantly kept in mind by the railway men, from the president down to the switchman in the yards, and the laborer in the shops, a great benefit may be obtained, and the real purpose of a railway more fully accomplished. That the railways are working along the right lines is evident from the interest the various organizations are taking in car inspection. The Master Car Builders' Association presented a complete report on the subject of overhead inspection at its last meeting, and is working with the American Railway Association toward a standardization of the methods of inspection for the different commodities. It has also modified the rules of interchange so as to expedite the making of proper repairs to loaded cars. While this is a move in the right direc-

tion, to secure proper inspection it will always require constant efforts of railway employees which can be secured only by constant supervision by their superiors.

INCREASES IN WAGES AND IN THE COST OF LIVING.

THE wage advance granted by the board of arbitration to the conductors and trainmen on the eastern railways was based almost entirely on a corresponding advance believed to have taken place in the cost of living. That there had been an increase in the cost of living seemed clear. If an increase in the cost of living is a sufficient reason for raising the wages of railway employees, it is a sufficient reason for raising the wages of other working men. Wages cannot be increased in any industry unless there be an equivalent increase in the efficiency of labor, without affecting the cost of operation and production in that industry, for in every industry the wages of labor are the principal factor in operating expenses, and in most of them, as, for example, in the transportation industry, wages are very much the most important factor. If the cost of operation and production in an industry is increased to any considerable extent, then the rates or prices charged for the services rendered or the goods sold by that industry must also be increased. But an increase in the charges for services and the prices of goods is, of course, an increase in the cost of living, and consequently justifies another increase in wages, which will cause another increase in the cost of living, which will justify another increase in wages; and so on *ad infinitum*.

Thus far the enormous increases in wages that have been made in the railway industry have not caused advances in rates, but the point has been reached where they must cause such advances if the railways are to remain solvent and the further expansion of transportation facilities is to be secured. Of course, when rates go up prices will be affected and the cost of living will advance more or less. In other words, we seem to have been caught in a vicious circle, and to be unable to find any place to break it. And thus far those who have tried to deal with the situation also have run around in circles. A dog chasing its tail presents an example of wisdom about equal to that presented thus far by economists, public men and industrial leaders in grappling with the related questions of increasing wages, increasing costs of production and increasing cost of living.

The conditions referred to may be due, as some economists contend, partly to a depreciation in the value of money caused by an excessive production of gold. To the extent that this is true, the remedy, of course, is to stop the depreciation of the dollar, if there is a way to do it. But all that is needed to demonstrate that this is not the only cause is the evidence of our own eyes. First, this evidence shows that the demands for the products of the land are growing faster in proportion than the supply of them. That this shall tend to increase the cost of living is inevitable. Second, the evidence certainly indicates that the average efficiency of labor is decreasing, and as the cost of labor is the chief factor in the cost of production, the inevitable result of this must be to increase the cost of production and thereby the cost of living.

Already great efforts are being made to reduce the disproportion between the growth in the demand for, and the supply of, the products of the land. There is need for educating the working man as to the conditions which he is producing as well as the farmer regarding the conditions with which he is confronted. There is a large class of working people whose members believe that they actually help to increase their wages by limiting the amount of work which they do. Now, increases in wages accompanied by increases in the efficiency of labor have no tendency to increase the cost of production and the cost of living; but increases in wages unaccompanied by increases in the efficiency of labor, or accompanied by positive decreases in it, have a very potent tendency to increase the cost of living; and an increase in the cost of living is equivalent to a reduction in wages. In other words, the labor union policy of promoting the inefficiency of

labor is simply a policy of cutting off the workman's nose to spite the capitalist's face.

Meantime, the railways are beginning to suffer worse than anybody else from the increase in the cost of living. They are required to raise wages of their unionized men without getting any return in better work done, and at the same time they are confronted by demands from the public for an improved grade of transportation. When the railways present the railway dilemma to boards of arbitration these boards say, as the one that just settled the trainmen's controversy said, that "the Interstate Commerce Commission, and not this arbitration board, has the duty of determining whether the railroads can earn, in addition to their other charges, without an increase in rates, the rates of pay that this board believes at the present time to be due to the conductors and trainmen."

The railways appealed once to the Interstate Commerce Commission for higher rates before the advances in wages of recent years were made. They are now appealing to it again. Let us hope that the commission will give as much consideration to the increase in the railways' cost of living as the arbitration boards do to the increase in the railway employees' cost of living.

MOVEMENT OF WAGES, PRICES AND RAILWAY RATES.

WE publish elsewhere in this issue an article entitled "The Movement of Prices and Railway Rates" from the pen of Clement Colson, the distinguished French authority on transportation matters. M. Colson shows that within recent years there have been large increases in the wages of labor and the prices of commodities throughout the world. He shows also that in all parts of the world these things have begun strongly to influence the tendency of railway rates. The trend of the charges for rail transportation was downward so long that it came to be regarded as a law of economics, and almost a law of nature, that they should go on diminishing indefinitely. But, as has heretofore been pointed out in these columns, and as M. Colson shows with fullness of illustration, the tendency of rates to decline has been arrested, and the trend has become upward.

M. Colson refers to advances, or the equivalents of advances, which recently have been made in England, Prussia, Wurtemberg, Italy, Switzerland, Belgium, Denmark, Russia, Austria and Hungary. This list refers chiefly to changes in rates made by railways owned by governments. It has been found necessary during the last year to make advances also on other state railways as far removed from Europe as the New South Wales lines and the Intercolonial in Canada. The Minister of Railways of New Zealand in his railway statement for 1913 calls attention to the fact that, although the gross earnings of these lines showed a substantial increase over the preceding year, the operating expenses increased still more, and in consequence, the percentage of working expenses increased from 67.07 to 68.13. The causes to which these increases in railway expenses in New England are attributed are the same as those to which similar results are attributed throughout the world. While the report suggests no increases in rates, it affords evidence that the present rates are insufficient to cover interest on the railway investment.

It would appear, in fact, that the United States, Canada and France are about the only leading countries in which there have been no net advances in rates in recent years. The English railways, although privately owned, succeeded in wringing an advance from the government when it was plainly necessary to grant it in order to prevent a great railway strike. In any other circumstances it is doubtful if the English roads would have secured an advance, and probably the chief reason why it has been found difficult to secure advances in France and the United States is that most of the railways of France, and all of those of the United States, are owned by private companies. Experience is making it increasingly apparent that it is easier for state railways to raise their rates than for private railways.

M. Colson attributes the general increases in the prices of commodities, and also the increases in railway expenses, throughout the world largely to the declining efficiency of labor. The evidence strongly indicates that whether in Europe, or Australia, or North America, the efficiency of labor is decreasing. The complaints of it which come from these widely-separated parts of the world are expressed in almost identical language. M. Colson refers to it in precisely the same way that officers of the English railways do; and the officers of English railways refer to it in precisely the same way that the officers of the railways of the United States do. It is obvious that a decrease in the efficiency of labor, unaccompanied by any reduction in the wages of labor, must tend to increase the cost of production, and therefore, the prices of commodities; and this result will be much more patent and extreme if a decline in the efficiency of labor is actually accompanied by an increase in its wages.

If the decline in the efficiency of labor is considerable, this, together with increases in wages, may more than nullify the tendency of the introduction of labor-saving machinery to reduce the cost of production. That a process of this kind has been going on is a growing belief among economists. M. Colson in his article shows that in France wages have increased greatly within recent years, but that the cost of living has increased almost as much in proportion, and in consequence, the purchasing power of wages has advanced but slightly. So, Professor J. Laurence Laughlin points out in an article, entitled "Monopoly of Labor," in the *Atlantic Monthly* for November, that "in the principal manufacturing and mechanical industries, leaving out salaried employees, in the 10 years from 1897-1907 (according to the index number of the Bureau of Labor), wages had risen from 99.2 to 122.4 or 23 per cent., while prices for food had increased from 96.3 to 120.6 or 25.5 per cent. That is, the purchasing power of wages fell 2.5 per cent. during that period of unusual expansion of business." The increase in the cost of living is given in wage arbitrations as the main reason why wages should constantly be increased. If it be true that the increase in the cost of living is largely due to advances in the wages and reductions of the efficiency of labor, then it is evident that to continue to increase wages because the cost of living is increasing is to move in a vicious circle. After all, it is obvious that, in the long run, the only way to increase the real wages of labor is to increase the productiveness of labor, because the real wages of labor are the amount of consumable goods which its money wages will command, and the only way to increase the amount of consumable goods that any given amount of money wages will command is to reduce the cost of production.

However, whatever may be the causes of the increases in wages and prices in general, it is evident that such increases cannot go on forever without affecting the amount of rates which railways must receive for their services, and equally obvious is it that it cannot be expected that railway rates in the United States shall remain stationary or trend downward while they are advancing in almost all other parts of the world. The play of given economic forces must produce in the long run the same results in this country as in other countries. M. Colson's article will well repay reading by those who imagine that there is anything singular about the railway conditions existing in this country, or about the steps which the railways are taking for the purpose of dealing with these conditions.

NEW BOOKS.

Safety Through the Block Signal System. By Hon. John J. Esch. Washington: Government Printing Office. Pamphlet, 11 pages.

Representative Esch, of Wisconsin, is the author of the most rational of the several bills which have been presented in Congress to make compulsory the use of the block system on passenger lines generally; and this pamphlet consists of a reprint, from the *Congressional Record*, of the speech made by him in the House on September 6 last, in the discussion on the clause

in the urgent deficiency bill appropriating \$25,000 for the use of the Interstate Commerce Commission in the investigation of matters concerning safety on railroads. Mr. Esch's speech includes all of the principal arguments in favor of the use of the space-interval system in train management. Presumably, the pamphlet is sent free by the clerk of the House Committee on Interstate and Foreign Commerce.

Standard Specifications for Steel and Steel Products. Bound in cloth. 6½ in. x 9½ in. Published by the American Society for Testing Materials, Edgar Marburg, Philadelphia, Pa., secretary. Price \$3, including translations into German, French and Spanish. Paper bound, in one language, \$1.

This book contains twenty standard specifications for steel products, as prepared by Committee A-1 of the American Society for Testing Materials and published in the year book for 1912. These specifications are printed in English, German, French and Spanish for the use of any of the members who desire to make their specifications known in foreign countries. It is hoped that other leading countries will follow this method. The following is a list of the specifications included: Bessemer steel rails; open-hearth steel rails; open hearth girder and high tee rails; steel splice bars; structural steel for bridges; structural nickel steel; structural steel for buildings; structural steel for ships; boiler and firebox steel; boiler rivet steel; steel axles; heat-treated carbon steel axles, shafts and similar objects; forged and rolled, forged, or rolled solid carbon-steel wheels for engine truck, tender and passenger service; the same for freight service; steel tires; steel forgings; steel castings; annealed steel forgings; steel shapes, universal mill plates, and bars; and lap-welded and seamless steel boiler tubes and safe ends, 2½ in. and under.

Statistics of Railways. Twenty-fourth Annual Report, 1911. Interstate Commerce Commission, Washington, D. C.

This report, more than two years behind time, has just come out; and the commission announces that on account of extraordinary demands on its appropriation for printing a charge of \$1 will be made for copies of the report. Orders should be sent to the Superintendent of Documents, Government Printing Office, Washington, D. C. Copies of the text of the report, 66 pages, may be had for 10 cents each. Remittances should be sent with orders, and for books mailed to foreign countries, except Canada, Cuba and Mexico, remittances must cover the cost of postage.

The 1911 report differs in numerous particulars from the preceding reports in the series. A notable difference exists in the substitution of three districts, substantially identical with the three great freight classification territories, for the ten territorial "groups" into which the United States was divided for statistical purposes in 1890, and also in the classification of railway companies with reference to their annual operating revenues. The report is of "Census" measure, giving a page 9 x 11½ in., which is much larger than that of prior reports.

The general character of the text of the report is similar to that of the 1910 report, but the statistical tables in the body of the report following the text differ materially in form and in detail from the tables in previous reports.

Section A, Part I, contains abstracts of reports rendered by steam railway companies of Class I; companies having annual operating revenues above \$1,000,000. These contain not only the usual income and profit and loss account and revenues and expenses, but many details of investments, of marketable securities; of redemption funds, insurance and provident funds, etc. Part II contains similar abstracts of companies of Class II; companies having annual operating revenues from \$100,000 to \$1,000,000. Part III is for companies of Class III those having annual operating revenues below \$100,000. In this the statistics are less elaborate.

Section B contains abstracts of reports rendered by lessor steam railway companies. An appendix contains statistics of switching and terminal companies.

RULES FOR KEEPING A LOOKOUT ON A BUSY ROAD.

An Outline of the Cure for "Mental Straggling." Prize Article; Adjudged the Best One of Forty-six Received.

By EDWARD F. MCKENZIE.

On the Pittsburgh division of the Pennsylvania Railroad after running a freight engine an average of ten years you receive a letter from the road foreman, nominating you for the position of passenger engineman if you qualify.

To qualify you must pass a perfect examination on eyesight and hearing, and make at least 85 per cent. on machinery, air brake, rules, time tables, special and block signal rules and signals.

On this division we have about 1,200 miles of track on main line and branches on which a man entering passenger service must qualify by an examination before our signal instructor before being permitted to run, as extra men go all over the division on anything their turn may call for.

We have automatic, semi-automatic, interlocking, manual, manual controlled and unattended (telephone) block signals; and it is absolutely necessary to know where each signal is, and what kind it is as well as what it indicates; and to be thoroughly familiar with the block signal rules that apply to each different kind of signal.

I have been an engineman eighteen years, seven of which has been on passenger, and have been on a regular run ten months. I will give you my way of working the extra passenger list, which is the most difficult position to fill successfully on the division.

I abstain absolutely from all intoxicating liquors.

I never come to work except in the best of health; take all the rest I can get; live happily with my family and leave my family affairs absolutely at home and think only of the work ahead when on duty.

I obey the rules of the company absolutely, in regard to (a) looking over the bulletin board, (b) comparing time with standard clock, (c) signing for general orders and registering, and (d) the rigid inspection of engine before going out.

I am very particular in testing air brake, signal whistle, sand pipes and injectors. Nothing takes your attention away from the track so much as a bad working injector, or an engine slipping because of defective sand pipes.

I tell all my stories and do all my talking to the fireman before leaving, and allow no conversation on the engine while running except the calling of signals and the answering of them, unless the fireman notices something wrong with his side of engine; then I instruct him to step up alongside of me and talk direct, while I look straight ahead; and not yell across boiler and take my attention away from track.

As we run all trains, local or through, as our turn calls for, it is necessary to study the time table before going out, pinning the leaves at your particular schedule and also the schedule of opposing trains,* so that you can see your figures at a glance in each direction and not run by a [standing passenger] train at an unprotected station.

We are now ready to leave. On the main line between Pittsburgh and Altoona we have about 1,800 signals, each way, in a distance of 114 miles; and have about 259 signals in the Pittsburgh station limits, 0.6 mile.

The greatest distance between signal bridges is 4,200 ft.; and at interlocking plants or where traffic closes up we have three in that distance; so it will be seen that we have to keep a good lookout, under normal conditions, as well as on track, for flagman in case of emergency.

We call all signals as well as the numbers of opposing trains, so we know what trains have been represented.

When diverted to freight tracks we have, in addition, at six places going in one direction and seven going the other, to receive a hand signal from switchman holding green flag by day and green lamp by night. The fouling of any of these switches without first receiving this signal is the same as running by a stop signal, and is a violation of the rules.

At bad places, such as high hills and public road crossings, where watchmen are stationed permanently, I keep a very close watch for them.

I recently saved an automobile and its occupants by using brake hard when I saw the crossing watchman give the automobile a signal to cross over when he had overlooked my train. As I was making a station stop I had no trouble in reducing speed sufficient to allow him to clear. If I had not noticed the watchman I should have struck the automobile.

I also had an example when I first went into passenger service of allowing the mind to stray: While planning a pleasure trip for myself and family I had to make a rough stop to keep from running by a regular station stop; that cured me, and I allow no mental straggling since.

But the discipline of the mind necessary to keep up a vigilant habit is, of course, a continuing matter. We all begin some discipline of the mind in childhood. In railroading a man must give attention to this as soon as he goes to firing. He should profit by other men's failures and resolve never to allow himself to do likewise.

While I was firing, my engineman ran past a signal while taking off his overclothes. I resolved never to take mine off until I arrived at the ash pit, and I have lived up to this resolve. Some roads in recent years have posted notices on this subject, forbidding this practice and also forbidding washing up approaching the terminal.

On parts of our division we receive two caution or distant automatic signal indications, the first one being two blocks or about 8,000 ft. in the rear of the stop signal, while the other is one block, or about 4,000 ft. back. But the rule nevertheless requires trains to approach the second distant prepared to stop; it may be set at stop because of an accident. The failure to observe this rule to the letter caused one of our best passenger enginemen to side-swipe a wreck that had occurred just ahead of him, and both he and his fireman lost their lives.

The sub-conscious mind (or instinct) should be trained to act promptly. While running about 35 miles an hour with a heavy passenger train on a dark night, I ran through a box car that had been derailed on the adjoining track and had fallen in my path. This was on the Horse Shoe curve. From the time the pilot struck, until the cab of the engine struck was about $\frac{1}{2}$ second; in that time I shut the throttle, applied air brake, opened sand valve, reversed engine, jumped down behind boiler and whistled brakes for the second engine. We stopped in a little over 130 ft., as we were going up hill. As I had no warning I could not have thought and acted so quickly; neither could the other engineman have done his part, if it were not a part of a runner's nature to be eternally on the lookout for trouble—trouble which we don't want to find.

One of our enginemen who saw a caution signal in the clear position and could not see the top or home signal because of smoke, ran by. It proved to be a surprise test, the signal being capped. He was severely disciplined; and the rest of us were in that way warned, by the company, that a strict observance

*The timetable of the Pittsburgh division is a book of 170 pages, $4\frac{1}{2}$ in. x $9\frac{1}{2}$ in. On each two facing pages there are columns for 13 trains. Some of the semaphore signals on this division are lower quadrant and some upper quadrant; there are both two-position and three-position signals; and on the main line there are some speed signals—those in which the upper arm on a post indicates regular speed; the second arm medium speed and the third, or dwarf arm, low speed.

of the rules is required, and that no chance taking will be tolerated.

A careful study of the sheet posted monthly, which shows all failures of men and the discipline imposed, as well as commendations for good service, is a great help to all enginemen who make proper use of the lessons.

And now to other railroad companies I would commend the P. R. R. practice of making the men comfortable. Have all gages and the water glass placed close to engineer with a good cab lamp showing on them. Have gage cocks, throttle, reverse lever and sand valve as convenient as possible; a good roof and a comfortable seat, and a storm window 4 in. x 24 in. hinged outside of cab, between the two side windows. This enables the engineer to see while passing trains. He can wipe this window off at any time, and be protected from the weather.

With the Pacific type engine I have had to use brake and use steam going down hill in order to raise the cloud of steam and smoke which hangs over the cab and obscures vision on account of short stack and long boiler. The Atlantic type of engine is much better.

THE WROUGHT STEEL WHEEL.*

By D. F. CRAWFORD,

General Superintendent of Motive Power, Pennsylvania Lines West,
Pittsburgh, Pa.

The development of the wrought steel wheel has been of interest to the managements of the railways from two viewpoints, viz.:

1. Its use as a substitute for the steel tired built-up wheel of various patterns used for passenger equipment cars and locomotive tenders.

2. Its application to freight carrying cars, especially those designed for mineral traffic, instead of the cast iron wheel generally used.

Even in the early stages of the development it was apparent that wrought steel wheels could be produced at prices which would warrant their introduction in lieu of steel tired wheels, and consequently a considerable number of them are now in service under passenger cars and the heavier locomotive tenders. The results obtained in such service indicate equal safety, with decreased investment and maintenance cost, as compared with those formerly used.

While wrought steel wheels are now used in large numbers for freight carrying cars, the length of time in such service has not been sufficient to give really conclusive information as to the relative economy of the wrought steel and cast iron wheels, especially the cast iron wheels conforming to the recently strengthened designs, and made under improved methods of manufacture. The data available, however, indicates that in the wrought steel wheel at present prices the cast iron wheel has at least found a competitor, and that a further reduction in the price of the steel wheel will probably lead to its more extended use for freight car purposes.

Quite a number of the freight cars of 100,000 lbs. capacity, built immediately after their advent in 1898, were provided with cast iron wheels of the lighter designs, and as practically all cars of the capacity named, built in the earlier years, were for mineral traffic, the combination of light wheels and heavy work resulted in more frequent failure and rapid wear than was desirable. Notwithstanding the fact that the weight of the cast iron wheel has been increased from time to time, it cannot be said that cast iron wheels in general use today give as good results for cars of 100,000 lbs. capacity, as were obtained with similar wheels for cars of 60,000 lbs. capacity. These conditions, coupled with the construction of cars having capacities as high as 140,000 lbs. carried on eight wheels, without doubt extended the use of the steel wheel and stimulated production.

As an indication of what service may be expected from the

steel wheel, the records of the mileage of a number of wheels under 100,000 lbs. capacity cars in freight service show that an average of about 180,000 miles per wheel has been obtained without reaching a condition requiring turning. This mileage represents from 18 to 22 years of service under the average freight car.

Accurate information regarding the mileage of cast iron wheels under cars of 100,000 lbs. capacity is, unfortunately, not available, but from records made in 1907 it was found that the average age of a number of wheels removed from service from cars of 100,000 lbs. capacity, was four years, corresponding to a mileage of from 32,000 to 40,000 per wheel. As there can be no question as to the relative strength of an equal section of wrought steel and cast iron, it would seem that for cars of 100,000 lbs. capacity and over, the steel wheel must have preference from this viewpoint.

The Pennsylvania System has followed with interest the development of the wrought steel wheel practically from its inception, and has made use of these wheels in considerable numbers during the entire period of their development. At the present time they are used exclusively for locomotive tenders in passenger service; locomotive tenders, over 5,000 gal. capacity, in freight service; passenger equipment cars in which the weight per wheel exceeds 10,000 lbs., and gondola and hopper cars of 100,000 lbs. capacity and greater, for mineral and mill traffic. The lighter tenders, passenger cars and freight cars of less than 100,000 lbs. capacity, as well as the box, refrigerator and stock cars of 100,000 lbs. capacity, are provided with cast iron wheels.

Up to the present about 325,000 wrought steel wheels have been purchased and the results obtained indicate the desirability of continuing the practice referred to. Of the total purchased, but 328, or about one-tenth of one per cent., have been withdrawn from service on account of breakage or cracks. Of these defects 164 were located in the tread, 69 in the plate, 50 in the plate and hub, and but 45 in the flange. The small number of defects located in the flange is particularly interesting, as it is at this point that the cast iron wheel of the design in general use has the least strength.

The majority of the 329 wheels referred to were used under heavy locomotive tenders, and the results are therefore, representative of the effect of the hardest kind of service. As these defects are those which occurred during the entire period of development of the steel wheel, and the number includes many manufactured under the less perfected processes at first employed, it is to be expected that even a more favorable record will be obtained in the future. In fact the processes now in use should practically eliminate the tread defects, as the larger portion of such defects were undoubtedly due to the effects of "pipes" in the original ingots.

The defects in the plate, and in the plate and hub are probably due to shrinkage strains, and their number clearly shows the desirability of further study as to their cause and the means for their elimination. Quite a large number of the wheels as at first manufactured gave short service on account of lamination of the treads (the same defect was frequently found in steel tires of the smaller diameters), but with the wheels as now made, the number having laminated treads is comparatively small.

On the application of steel wheels to mineral carrying cars it is the practice of the Pennsylvania System to increase the nominal carrying capacity from 100,000 lbs. to 110,000 lbs.; thus increasing the permissible lading from 110,000 lbs. to 121,000 lbs. As there is no doubt of the wheel having ample strength to permit obtaining the full capacity of the axles, this increase in capacity not only adds to the earnings of the cars, but assists in keeping them always provided with a full set of steel wheels, as this kind of wheel only is the standard for cars of over 100,000 lbs. marked capacity.

The construction of many freight-carrying cars of over 100,000 lbs. capacity still further broadens the field for the use of the steel wheel, and makes necessary the further strengthening of the cast iron wheel on the lines already indicated by the makers.

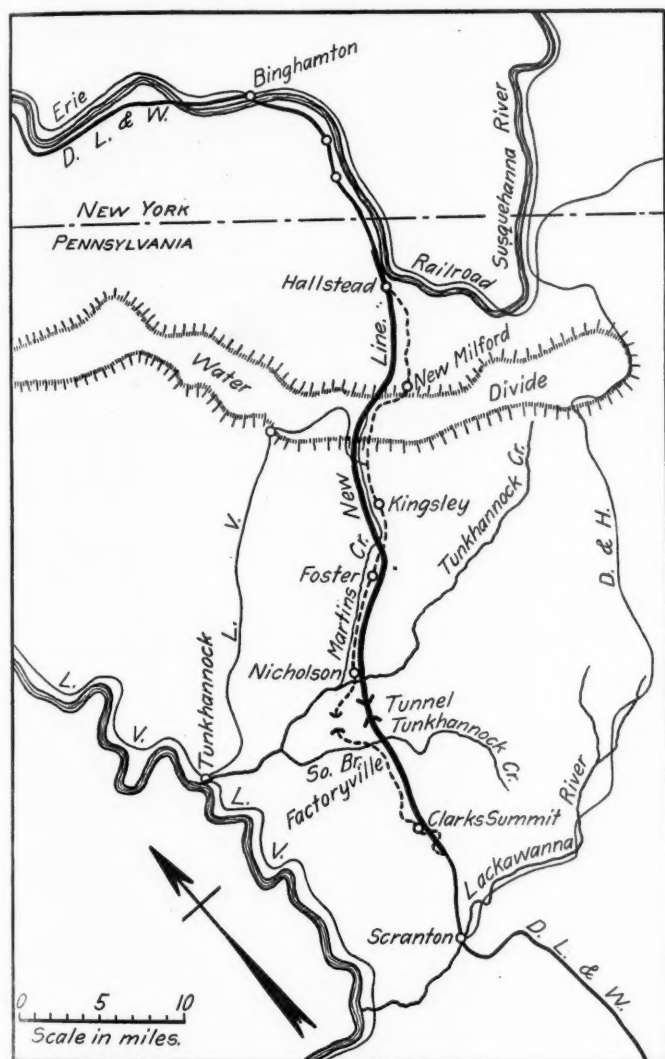
*Discussion of a paper on the History and Problems of the Steel Wheel presented before the American Iron and Steel Institute, Chicago, October 24, by John C. Neale, structural engineer, Carnegie Steel Company, Pittsburgh, Pa.

SUMMIT-HALLSTEAD CUT-OFF OF D. L. & W.

The First of Two Articles on a Forty-Mile, Three-Track Line
Built on a New Location at a Cost of About \$12,000,000.

A grade reduction project which involves some of the heaviest grading and concrete bridge work ever undertaken is now under way on the Delaware, Lackawanna & Western between Clark's Summit, Pa., about seven miles north of Scranton, and Hallstead, Pa., about 14 miles south of Binghamton, N. Y. A general description of this work was published in the *Railway Age Gazette* of April 25, 1913. Although contracts for this work were let early in the spring of 1912, and the contractors on all sections have pushed operations as fast as the best equipment

total cost of the improvement is about \$12,000,000. This expenditure was justified in the preliminary studies by the consideration of the items mentioned in the previous article, including the reduction in grades and the elimination of pusher engines, rise and fall, curvature and distance. The new line will make possible very important operating economies as it reduces the length of line by 3.6 miles and the maximum grade eastbound from 1.23 per cent. uncompensated to 0.68 per cent. compensated, and westbound from 0.52 per cent. uncompensated to 0.237 per cent. compensated. The amount of rise and fall eliminated amounts to 327 ft., the maximum degree of curvature is reduced from 6 deg. 22 min. to 3 deg., and 2,440 deg. of central angle or about 60 deg. per mile are saved by the new line. The third track, which is provided by the reconstructed line for practically the entire distance will also be an important factor in handling the increasingly heavy traffic.



Location of New Cut-Off Between Clark's Summit and Hallstead.

and organizations have made possible, the grading is now only about 50 per cent. completed and bridge work 42 per cent. The following description will deal only with the grading and tunneling. A second article to be published in an early issue will describe the early stages of the bridge work up to the present time.

In the 39.6 miles of new line the excavation quantities reach the high totals of 7,600,000 cu. yds. of rock and 5,100,000 cu. yds. of earth in addition to 146,000 cu. yds. of tunnel and shaft excavation, about 175,000 cu. yds. of earth and 31,000 cu. yds. of rock in masonry foundations and 250,000 cu. yds. of earth and 16,000 cu. yds. of rock for highway realignment, a grand total of 13,318,000 cu. yds., or over 336,000 yds. per mile of line. The

IMPROVEMENT IN GRADES.

The old line north of Scranton rises on a 1.45 per cent. grade to Clark's Summit, then descends on a 1.23 per cent. grade for six miles to La Plume. For the next 4.2 miles to the Nicholson tunnel, the grade rises at the rate of 0.53 per cent. From the tunnel it descends on a 1.23 per cent. grade for three miles to the crossing of the Tunkhannock creek, near Nicholson, and then ascends the valley of Martin's creek for 18.5 miles on a 0.4 per cent. grade to New Milford summit, from which it descends for nine miles to Hallstead on an irregular grade having 0.89 per cent. as a maximum.

This line is used by an average of 26 passenger and milk trains, 16 manifest freight and 31 slow freight trains daily. The maximum tonnage for slow trains in both directions, is 3,825 tons for the heaviest mikado locomotives, and 2,750 tons for the other engines, this tonnage being fixed by the grades on the remainder of the engine district which extends from Scranton to Elmira. On the section between Scranton and Hallstead eastbound trains with the maximum tonnage now require two pusher engines from Hallstead to New Milford, and three helpers from Nicholson to Clark's Summit. Westbound trains now require four helpers from Scranton to Clark's Summit, and one from Clark's Summit to New Milford.

The new improvements do not affect the grade between Scranton and Clark's Summit, as Scranton is located in a deep valley with rising grades on all sides, and the reduction of grade on this section would have required excessive length and curvature. From Clark's Summit north the new line descends on a 0.682 per cent. grade for 6.4 miles, and from there to the Tunkhannock creek crossing the grade is 0.2 per cent., except through the tunnel and approaches where it is reduced to 0.15 per cent. From Nicholson to New Milford summit the line ascends on a 0.237 per cent. grade and from there to Hallstead it descends on a grade of 0.61 per cent. The new and old grade lines cross a short distance on each side of the summit, the new summit being 16½ ft. lower than the present one. The maximum-tonnage trains on this new grade will require only one pusher from Hallstead to New Milford, and one from the Nicholson tunnel to Clark's Summit. All pusher service will be eliminated westbound, except that between Scranton and Clark's Summit, which, as explained above, will remain the same as at present.

CHANGES IN LINE.

The new work begins about one mile south of Clark's Summit station, the new line crossing the old twice at a grade which is 29 ft. below the old at the Clark's Summit station. This summit cut is about two miles long and from 20 to 60 ft. deep. Near the north end of this cut the new line swings away from the

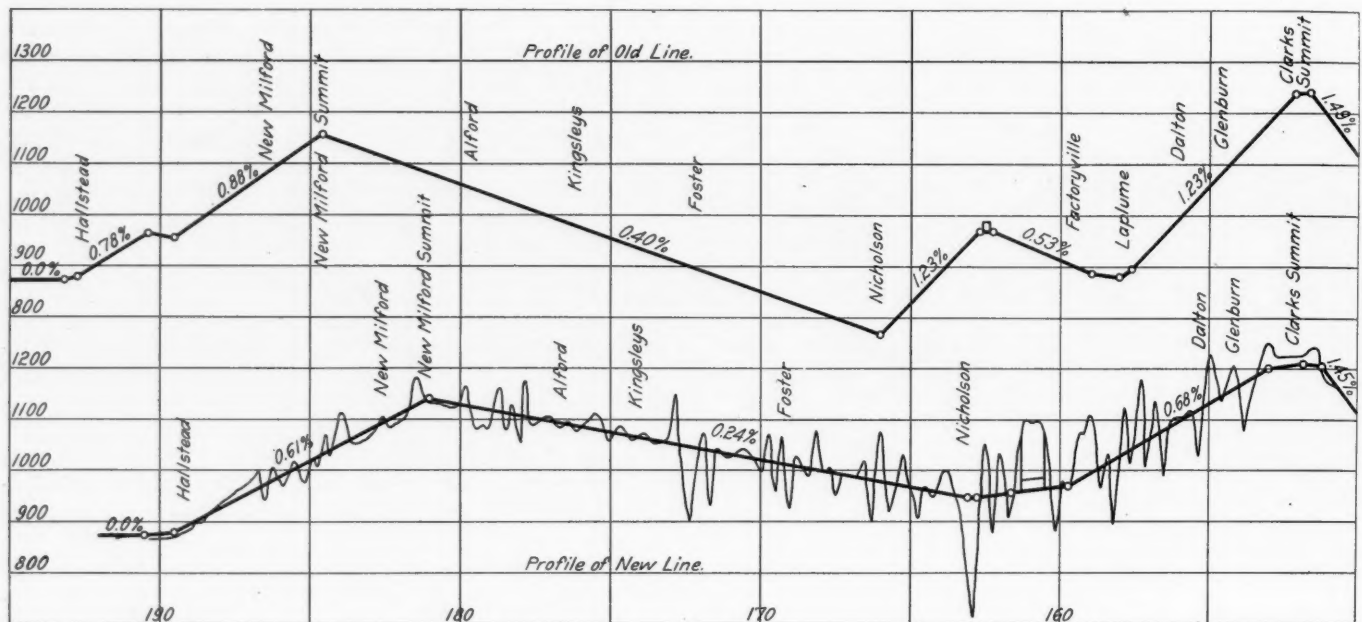
present one, reaching a maximum divergence of about 1.5 miles near Factoryville, and returning to within a few hundred feet at Nicholson. The old line between Clark's Summit and Nicholson follows the drainage, while the new line cuts across it at right angles, requiring numerous cuts and fills exceeding 100 ft. in depth. The south branch of the Tunkhannock creek is crossed on an embankment 140 ft. high, requiring 1,600,000 cu. yd. of material, and the divide between the north and south branches of this creek is passed in a double track tunnel 3,630 ft. long, with approach cuts aggregating 1,000,000 cu. yds. of excavation. The new line will be carried over Tunkhannock

slopes, requiring heavy work to keep within the standard of curvature, which is 2 deg. wherever possible, with a maximum of 3 deg. in three instances. From New Milford to Hallstead the work is much lighter, the improvement ending about two miles north of the Hallstead station.

CONTRACTORS AND GENERAL METHODS.

For construction purposes the work is divided into ten sections which are being handled by the following contractors:

Section 1—Robert Grace Contracting Co.
Sections 2 and 3—Reiter, Curtis & Hill.
Section 4—D. W. Flickwir.

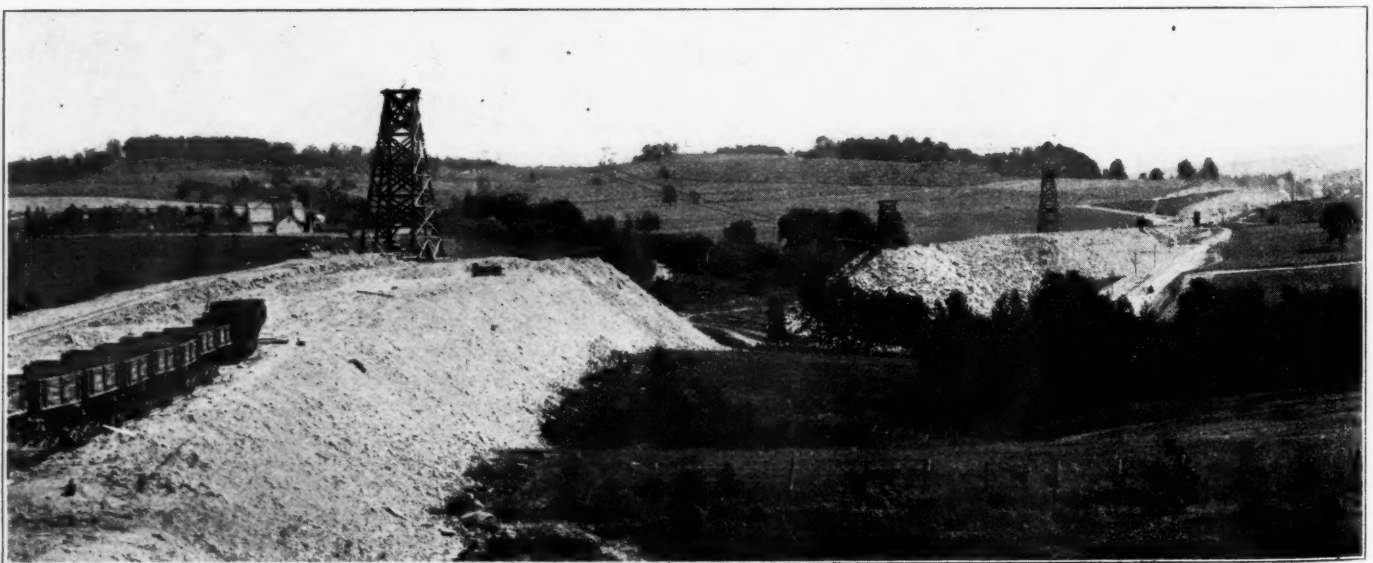


Profile of Old and New Lines North of Scranton.

creek valley on a long concrete arch viaduct on which the top of rail will be 240 ft. above the bed of the stream. Between Nicholson and Kingsley the new line lies high up on the east slope of Martin's creek valley, and is nowhere more than a few hundred feet from the present tracks which are on the same side of the valley. Near Kingsley the new line crosses the present tracks and the stream on a concrete arch bridge similar to the Tunkhannock structure. The top of rail on this bridge is 150 ft. above the bed of the stream and 88 ft. above the old tracks. The Martin's creek valley is very narrow with steep and irregular

Part of Section 5—Flickwir & Bush, Inc.
Part of Sections 5 and 6—Waltz & Reece Construction Co.
Part of Section 6—James A. Hart Co.
Section 7—Timothy Burke.
Section 8—F. M. Talbot Co.
Section 9—P. McManus.
Section 10—W. H. Gahagan.

On account of the unusual proportions of all of this work only the heaviest and most improved machinery is employed in its prosecution. The contractors are using 30 steam shovels in making the excavation. Three dumping cableways have been



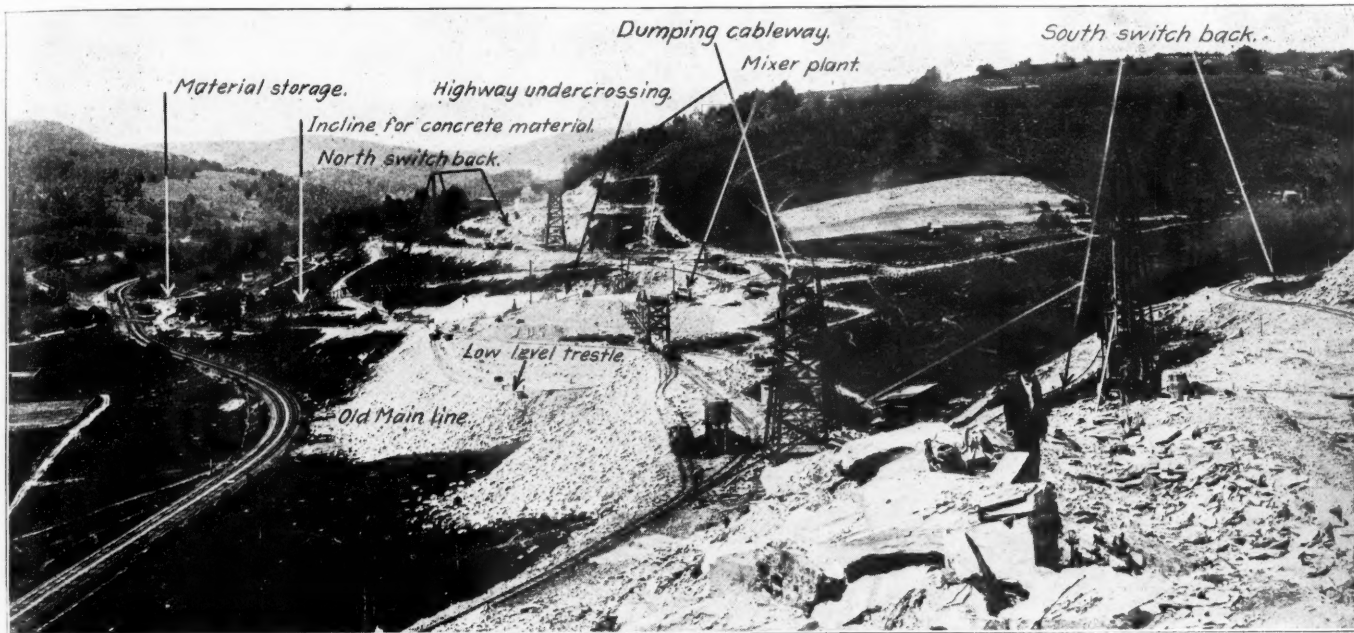
Ackerly Fill, Showing Clark's Summit Cut in Distance.

built for making high fills, and in at least two cases an unusual method of handling loaded cars from a cut down to the lower level of a high fill has been introduced. One of the most striking features of this work is the use of steam shovels for excavating masonry foundations, in lowering highways for under-grade crossings and other comparatively small jobs ordinarily handled by teams. One contractor who used a 30-ton Thew

being three cuts over 100 ft. deep and five fills over 100 ft. high. There are six cuts and eight fills with a yardage of over 500,000 yds. each.

THE ACKERLY FILL.

It is only necessary to describe a few of the more important cuts and fills to indicate the magnitude of the work and the



Looking North Over Riker Fill, Showing the Two Methods of Placing the Embankment, also the Concrete Plant for Building the Highway Arch.

shovel with a $\frac{1}{2}$ -yd. bucket for road and foundation excavation found that it worked very economically, especially in consideration of the high rate paid to labor on this work. As has been mentioned, deep cuts and high fills are very common, there

methods used in handling it. The Ackerly fill, which is located on the first section, contains 830,000 yds., and has a maximum height of 115 ft. On account of the extreme height the contractors used a dumping cableway for making this fill, intro-



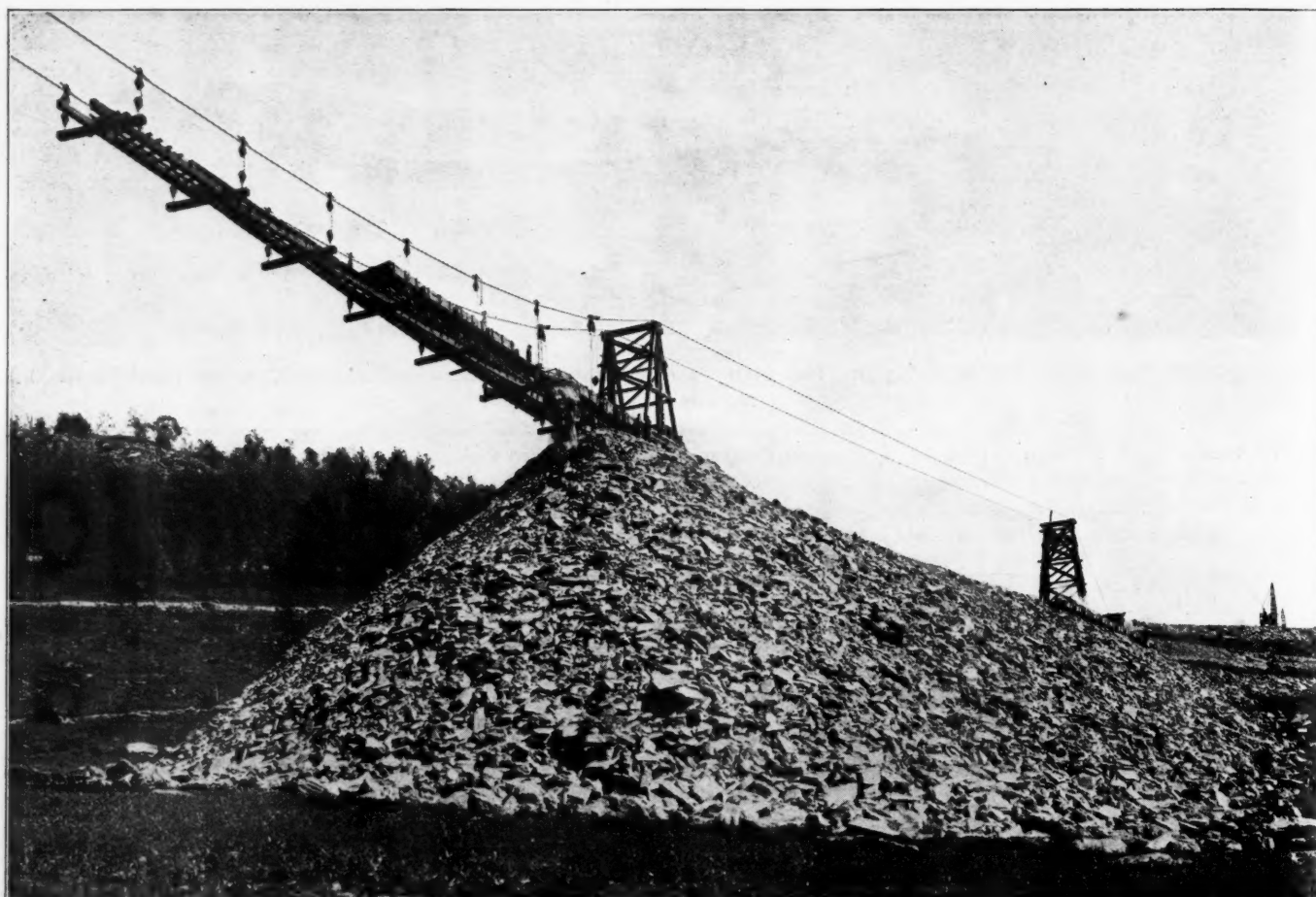
Slayton Cut and Switchback to Fill in Foreground.

ducing an added advantage by dumping at both ends. This cableway had a maximum length of 2,200 ft. between anchors which length in itself is very unusual.

Instead of moving forward one end tower as the fill progressed, a third movable tower was used and the main towers allowed to remain fixed. The movable tower was kept close to the end of the fill to support the cable close to the dumping point. The cars were backed out on a track suspended from the two cables in the same manner as in cableways previously used. The dumping was carried on for a considerable time from one end in the usual manner, but in order to hasten the work it was decided to dump from both ends. When this method was first tried some difficulty was occasioned by the slack in the cable between the movable and the main towers. When a train of ten loaded cars was run out on the cableway this slack would all be pulled over the tower, and the weight of the cable itself would cause the slack to run back when the weight of the train

THE SMITH FILL.

The Smith fill, having a maximum height of 120 ft. and containing 540,000 yds. of material, was made in two stages by trestling. An unusual method had to be adopted here to handle the material while the roadway arch under the deepest point of the fill was being constructed. A large part of the material had to be taken out of the Slayton cut north of the fill and carried over the uncompleted arch to make the south end of the fill. The first trestles were built at various angles south of the concrete arch to utilize as much of this material as possible in carrying out the base of the fill to its full width. In the later stages of the work a second trestle was built on the newly made fill and dumping was carried on simultaneously on both levels. In order to get the narrow gage dump cars across the gap in the fill, which had to be left open for highway traffic, without building a temporary trestle up to the grade of the adjacent cut, these cars were dropped down a steep incline from the cut and



One End of Cableway at Riker Fill, Showing Movable Intermediate Tower.

was removed. By cutting the train and dumping five cars at a time it was possible to work at both ends by alternating so that the weight of both trains would never be on the cable at the same time. In order to eliminate this difficulty the cable back of the movable tower was finally anchored by short cables to dead men, allowing trains of ten cars to be dumped at either end, although at the time the accompanying illustration of this cableway was made, cars were only being dumped on one end. This fill is on a 2 deg. curve, which is shaped in widening. It will be made wide enough for four tracks in order to use the material from the long cut through Clark's Summit, which contains 1,450,000 yds. The old line opposite this fill included a 5 deg. curve with 180 deg. of central angle, the lack of compensation for curvature increasing the grade at this point to about 0.75 per cent.

run across a trestle which was just high enough to clear the new arch. A cable system was used on this incline by which a string of empties at the bottom was pulled up by the loads coming down. A similar system will be described in more detail for the South Branch fill. A dinky engine picked up the loaded cars at the bottom of the incline, pulled them across the trestle and back onto the new fill whereby a series of switch backs the high or low dumping trestles were reached. The situation is shown quite plainly in the two accompanying photographs.

SOUTH BRANCH FILL.

The largest fill on the line was across the south branch of Tunkhannock creek. The maximum depth of this fill is about 145 ft., and the yardage is approximately 1,600,000. On account of the extreme depth of this fill it is necessary to make the

deepest portion in three lifts, and an unusual method of placing the first lift was adopted. A large part of material comes out of the Crisman cut just north of the big fill, and in order to get this material down to the level of the first lift a balanced incline system, similar to that mentioned in the description of the Smith fill is being used. At the top of the slope from the new cut a pair of hoisting drums equipped with a friction brake are located between the narrow gage tracks leading from the

point the line is benched in a side hill above the old line, which is shown to the left. The material for the fill was secured from the Shick cut adjacent on the south, and the Capwell cut on the north. The excavation was carried on in these cuts simultaneously, a cableway being used on the south end, and a long switch back leading to a low level trestle dump on the north end. A switch back also had to be used on the south end to carry the material down from the top levels of the cut to the



Smith Fill Under Construction Showing Two Heights of Trestles.

cut. These tracks are located so that cables attached to cars on the incline can be run directly to the drums. A train of loaded cars coming from the cut is pushed to the head of the incline and attached to a cable from one drum. At the same time the other cable is attached to a string of empties waiting on the fill at the bottom of the incline. The loaded cars are then allowed to run down the incline, pulling up the empties, the speed being regulated by the friction brake on the continuous axle of the two drums. As the bottom of the fill is 472 ft. wide a circular track was laid from the bottom of the incline so that the

dumping cable which is at grade. These switch backs are clearly indicated in the illustration.

CUTS.

The Slayton cut, which is the deepest through cut on the line, is shown in one of the accompanying photographs. This cut contained 420,000 yds. of material, the maximum depth being 115 ft. The maximum haul of material from this cut was about one mile. Another of the deepest cuts is encountered in the side hill work in the Martin's creek valley, where a center height of



South Branch Fill, Showing Balanced Incline to Lower Lift and Upper Level Trestle.

cars could be handled by a dinky to any desired part of the fill. The upper lifts of the fill will be made from trestles, one of which is shown in the accompanying photograph.

THE RIKER FILL.

The work on the Riker fill is unusual on account of the variety and number of operations which have been carried on simultaneously in prosecuting the work. This fill is 1,600 ft. long with a total yardage of 500,000. The accompanying photograph shows the method of handling this work very clearly. At this

114 ft. and a maximum height on the upper slope of 167 ft. is obtained. The yardage in this cut is 480,000. No unusual methods of excavation were adopted, as in most cases the rock which was encountered broke up very well when sufficiently heavy charges of powder were used.

NICHOLSON TUNNEL.

The double track tunnel carrying the new line through the ridge between the two branches of Tunkhannock creek is 3,630 ft. long. It is being driven from two shafts located at the third

points. These tunnel shafts were excavated 34 ft. x 54 ft., and lined with concrete 2 ft. thick, making the inside dimensions 30 ft. x 50 ft. The shafts are about 135 ft. deep, the upper 30 ft. being through earth and the remainder through rock. They will be provided with chimneys 20 ft. above the ground surface to induce ventilation in the tunnels to remove the locomotive gases.

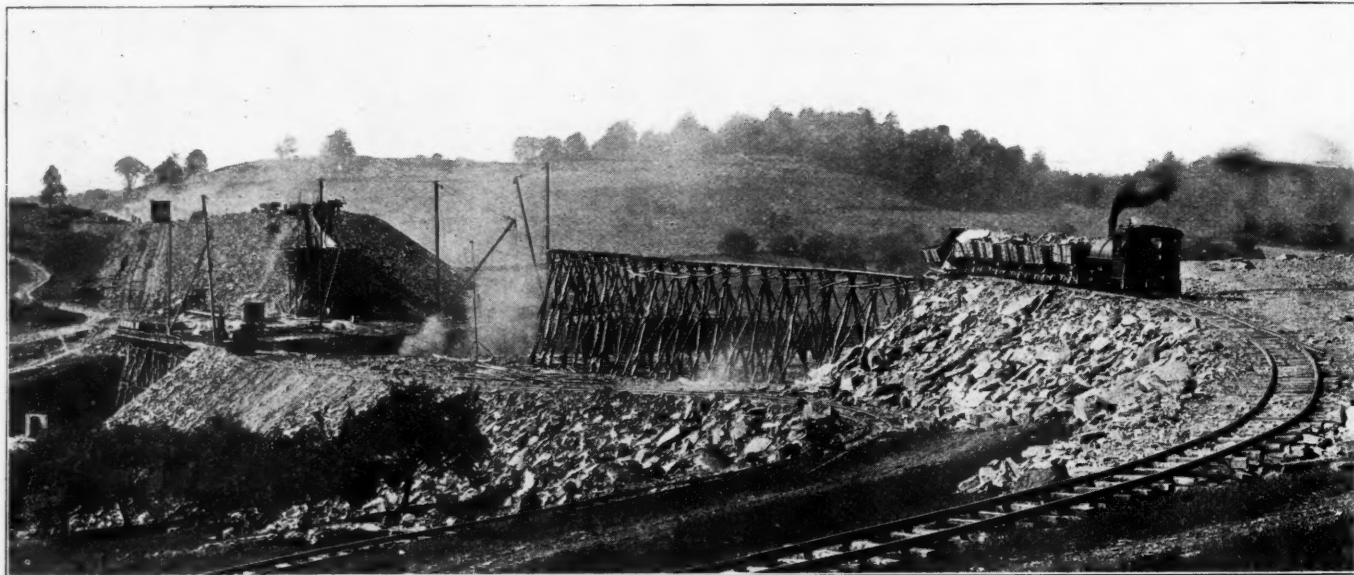
As the tunnel cuts were not completed before the shafts were sunk headings were started in both directions from these shafts, and additional headings will be driven from the portals as soon as the cuts have been made. These headings are 7 ft. x 8 ft. in cross section and will be enlarged to the full width later. The material removed from the shaft headings was at first brought up in 2-yd. scale boxes by a derrick having a boom about 86 ft. long. Subsequently elevators were established in both shafts, the muck being transported from the headings in Koppel cars and discharged into buckets at the foot of the elevators, which in turn are dumped automatically into chutes at the top of the elevators, the chutes discharging into cars at the surface for removal to spoil banks. Electric locomotives will be used to haul the material to the shafts as soon as the headings have been driven far enough to warrant it.

The tunnel cross section is 8 ft. 5 in. from base of rail to springing line, the arch having a radius of 18 ft. 6 in., where

PRIVATE CAR TROUBLE IN ENGLAND.—After the end of this year no freight cars will be allowed on the railways in Great Britain which are not fitted with spring buffers. This is in accordance with a notice issued by the Clearing House seven years ago; but it is said that the proprietors of coal mines have from 8,000 to 12,000 wagons still in use which have only "dead" buffers—those not fitted with springs. What can be done with these cars after December 31 is a question which now gives rise to some anxiety.

NEW BULGARIAN RAILWAY.—Now that peace has been declared between Turkey and Bulgaria, the first consideration of the Bulgarian government will be the construction of a national railway linking up Old Bulgaria with the Aegean sea, through Bulgarian territory, as the old line to Dedeagatch traverses Turkey. A recent cabinet council, presided over by the king, decided in principle on the construction of the line. It will start from a station on the Philipopolis-Adrianople line, will pass through Haskovo and Kirdjali, and terminate at Porto Lagos. According to official estimates, the construction of this line, to be 108 miles long, will cost \$5,000,000, and will require three or four years to build, owing to the engineering difficulties to be overcome.

THE ARGENTINE AMALGAMATION.—The main reason for the sudden withdrawal of the bill for amalgamating the Buenos



Smith Fill, Showing Balanced Incline and Second Level Dumping Trestle.

timbering is required and 17 ft. where the material is self-supporting. The subgrade is 2 ft. below the base of rail, with a ditch 1 ft. deep on each side. Where lining is required it consists of a four-course vitrified brick arch resting on a concrete wall 2 ft. thick below the springing line, faced with one course of vitrified brick bonded to the concrete. The net section of this tunnel requires the excavation of about 30 yds. per lineal foot. Blue and red sandstone and red shale are encountered in alternating layers of various thicknesses. All of the rock is horizontally bedded.

The entire work of building this cut-off was planned and is being executed by G. J. Ray, chief engineer. F. L. Wheaton is engineer of construction in immediate charge of the work.

SWISS FEDERAL RAILWAYS.—The latest statistics of the progress of the Swiss Federal Railways during the last 10 years, 1903-12, have just been issued. They show that the railway mileage in that period has increased by 31 per cent., the receipts from passenger traffic by 49 per cent., and from freight traffic by 54 per cent. The number of passengers carried increased by 64 per cent., and the number of tons of merchandise by 46 per cent.

Ayres Great Southern and the Buenos Ayres Western railways was due to the competitive policy of the Buenos Ayres Provincial Government. That much was made clear in the exhaustive speeches on the subject which the chairmen of the two companies delivered to their respective shareholders at the ordinary general meeting. The decision of the provincial government to introduce a bill in the legislative chamber to empower them to construct a net work of 8,000 miles of lines in connection with the narrow gauge railway they have been engaged in building for several years past from La Plata to the western boundary of the province came, as Mr. Simson expressed it, like a bolt from the blue. The idea of the provincial government was to cross and recross the two companies' existing lines with the object of controlling them and preventing their obtaining a monopoly and abusing their position by charging prohibitive tariffs, although the Mitre law amply provides against any such contingency. In the circumstances, the directors' decision to withdraw the amalgamation bill is not to be wondered at. Mr. Simson, however, takes a hopeful view of the situation, and is convinced that the sense of justice and fair play which characterizes the majority of the Argentines will ultimately prevail and that the province of Buenos Ayres will not give effect to its proposals.

EASTERN TRAINMEN'S WAGES SETTLED.

Messrs. Low and Finley Advance Wages Because of Increase
in Cost of Living. Many Demands of Employees Denied.

The arbitrators under the agreement of July 26 last, Seth Low, John H. Finley, W. W. Atterbury, A. H. Smith, L. E. Sheppard and D. L. Cease, chosen to consider the demands of the conductors and trainmen of 41 eastern railroads, issued their award on Monday last and filed it in the United States District Court, in New York City, in accordance with the law under which the arbitration was undertaken.

This settlement affects about 20,000 conductors and 80,000 trainmen, and the average of the increases awarded amounts to 7 per cent. The operating expenses of the railroads amounted in 1912 to \$748,892,071, and the payments in wages to conductors and trainmen amounted to \$85,646,080. The population of the district served by the forty-one railroads is 47,000,000. The increase asked for by the employees was estimated at \$17,975,688. It is estimated that the gross increase will be about \$6,000,000.

Dissenting opinions were filed by Messrs. Atterbury and Smith, and also by Messrs. Sheppard and Cease. The most vital questions were settled by the votes of Messrs. Low and Finley.

Following are the salient passages of the report, which fills 75 pages:

Both the Order of Railway Conductors and the Brotherhood of Railroad Trainmen accept the open shop, and these brotherhoods neither believe in nor practice the sympathetic strike, and conductors and trainmen not affiliated with the organizations were taken into consultation at every stage of the proceeding; so that it must be assumed that the propositions submitted for arbitration represent the views of substantially all the conductors and trainmen in the employ of the railroads concerned.

It is important to consider whether the present demands begin a new cycle, so to speak, on the part of the railroad train employees for a further advance in wages; or whether the conductors and trainmen are closing an old cycle during which the engineers in 1912, and the firemen in 1913, received advances which the conductors and trainmen have not yet received. It is the prevailing opinion of the Board that the present movement is the close of an old cycle and not the beginning of a new one.

Territorial Differentials.—These movements usually move in cycles; for if one brotherhood obtains an advance the others have usually asked for a corresponding advance; but this is only one phase of the wage problem with which the railroads have to deal. By custom the railroads and the brotherhoods have recognized that the railroads of the United States are divided into three wage zones, the eastern, the southern and the western. The wage scale in the eastern territory has always been less than the scale paid in western. Until 1910, the wage scale in the southern territory had always been less than the wage scale either in the eastern or in the western territories. It has been for many years the object of the organizations engaged in this arbitration to obtain in the eastern territory the same scale of wages as prevails in the West.

As between conductors and trainmen a satisfactory differential has been reasonably well established. In passenger service it is agreed by the men that a brakeman should receive approximately 60 per cent. of the wages of a conductor; and in the freight service 66⅔ per cent. has been agreed upon. . . . This Board believes that before a standardization of pay for conductors and trainmen can be brought about between the East and the West, the organizations concerned should formally and officially commit themselves to the policy of standardization between East and West. In the absence of such an accepted policy, were this Board to place the pay in the East on the western basis, such an increase might serve to bring about a

new movement in the West to secure the old differential as against the East.

Independent Inquiry Recommended.—Some public authority authorized by the Congress should make an independent inquiry as to whether there is any longer any substantial reason for the maintenance of a wage differential between the West and the East; whether there can be a scientific basis for the payment of railroad employees who operate trains. The body making such inquiry should not attempt to fix wages; only make a study of the proper basis for the fixing of wages. Neither is it suggested for a moment that wages, when agreed upon by any process, should become unchangeable; but by the process suggested, some of the artificial embarrassments to the equitable adjustment of railroad wages could be removed. It is possible that the Commission on Industrial Relations recently appointed by President Wilson may be competent to carry out the suggested inquiry.

Recent History.—So far as the conductors and trainmen are concerned the year 1910 marks a new epoch in the East and South. In that year collective movements were undertaken both in the eastern territory and in the southern. The conductors and the trainmen's demand on the Baltimore & Ohio for the rates of pay then prevailing in the western territory became the subject of mediation under the Erdman Act, and the existing rates of pay now prevailing in the eastern district, with some modifications, were established by agreement in that proceeding. Both conductors and trainmen got substantial increases, but not the full western rates then prevailing. Following this agreement the conductors and trainmen obtained substantially the same rates and conditions on most of the other roads of the eastern territory. This was accomplished by agreement in some cases, and in others as the result of what is called the Clark-Morrissey award in the case of the New York Central.

Among the rules of service thus agreed upon were these: (1) that, in the passenger service, pay should be based on a day's run of 155 miles; (2) in freight service on a run of 100 miles; (3) that consecutive time should be paid for, beginning from the time when the man reports for duty; (4) that overtime should be paid for at hourly rates and by the minute. With inconsiderable exceptions these rules now prevail on all of the 41 roads embraced in this arbitration. Following the settlement with the railroads of the eastern territory, the conductors and trainmen began a collective movement in the southern territory. This movement also began in 1910. When concluded, the railroads in the southern territory had agreed to all of the foregoing rules, and to that extent standardization of rules affecting pay now prevails between the East and the South. As a result of another collective movement in the South, in 1912, the rates of pay for conductors and trainmen were fixed for the first time at a point higher than those now prevailing in the eastern territory, but lower than those now prevailing in the western territory. Some of the rules affecting pay established for the South are more favorable than the corresponding rules to be found in either the eastern territory or the western.

Existing Differentials.—Since 1910 the railroads of the western territory have granted a 10 per cent. advance to all of their employees in train service, and the engineers in the western territory enjoy a wage scale that is 5.3 per cent. in excess of the engineers' wage scale in the eastern territory as determined by the arbitration of 1912; the firemen in the West, a wage scale that is 7.3 per cent. higher than the firemen's wage scale in the East, as determined by the arbitration of 1913; the conductors in the West, a wage scale that is 16.1 per cent. higher

than the conductors receive in the East, as determined by the adjustments of 1910; and the brakemen in the West, a wage scale that is 7.1 per cent higher than the brakemen's wage scale in the East, as determined by the adjustments of 1910. The differential in favor of the western brakemen would be much larger, except for the fact that the wage scale of yard brakemen in the eastern territory in the first class yards is within 2½ per cent. of the wage scale of yard brakemen in the western territory. Inasmuch as the yard brakemen constitute 32 per cent. of the total number of brakemen, the effect of this small differential in yard service is palpable. The same situation exists with reference to conductors in yard service. It is, therefore, apparent that the existing spread between the East and the West as it affects conductors outside of the yard service is very large.

Increase Requested.—This is an outline of the situation existing in the various railroad territories at the time when this arbitration began. This arbitration affects about 100,000 men (as before stated) and the vast importance of the interests directly affected is evident. A remarkable series of exhibits have been prepared for use in connection with this arbitration. The information submitted by the men has been compiled from the reports of the Interstate Commerce Commission, with great carefulness, by Frank Warne, a trained statistician, who has been engaged upon this work for approximately nine months. The statistics submitted by the railroads have been prepared in part from the reports of the Interstate Commerce Commission, and in part from their own records, with equal thoroughness, by a sub-committee of the conference committee of managers. The Board is not to be held responsible for the conclusions claimed to be established by these figures by either one side or the other; but the Board takes pleasure in calling attention to this remarkable body of information in regard to the railroads of the country. This careful and comprehensive study of the whole situation by the parties to the controversy goes a long way to justify these collective movements for the adjustment of pay and conditions of service. No study of this character was possible so long as each railroad was dealt with by itself; and it is probable that the ultimate outcome of this method of procedure, when every detail is seen in the light of the larger situation, will be more wise and more just to all the parties concerned than any result that could possibly be reached by an indefinite number of smaller proceedings. . . .

Review of Argument.—In brief, the men ask that they be given the western rates of pay while retaining the rules and regulations affecting pay prevailing in the East. For example, in the West men are paid by the month on the basis of varying standards of monthly runs; in the East they are paid by the mile and by the day. This difference in method of payment makes an exact comparison between eastern and western rates of pay impossible. The proposals submitted for arbitration also ask for certain new rules, such as time and a half for overtime, which at present do not prevail in any of the three territories. All of these rules, if adopted, would still further increase the rates of pay established.

The men ask for the western rates of pay:

- (a) In the name of standardization;
- (b) On account of increased cost of living;
- (c) On account of increased risk, labor and responsibility;
- (d) On account of the increased productivity of the work of a train crew;
- (e) On the ground that the profits made by the railroads in recent years have increased out of proportion to wages.

Standardization.—The men urge standardization on the general ground that railroading "per se" is worth just as much in one part of the country as in another, with the exception of the so-called mountain district in the western territory where permanent natural conditions justify now and may justify always a differential in favor of that district. It is declared that the essential conditions affecting the lives of railroad men in the operation of railroads are substantially identical in all three territories; that

with local variations a man could live within a thousand miles of Chicago, east, west or south, and enjoy in all of the reasonably settled parts of the country the same privileges and opportunities in one territory as in the others. The cost of food and other necessities would equalize themselves wherever a man lived, while a man would find as many of the opportunities that go to make life enjoyable and pleasant in one territory as in another. Rules and practices are constantly becoming more and more alike. The average time on duty of conductors and trainmen in the East is distinctly longer than in the West.

The answer of the railroads urges that there is no such thing as standardization of rates and rules in any one railroad territory, much less as between territories, because the rules differ everywhere. In the eastern territory the railroads admit that there is a fair approximation to standardization within the territory, both as to rates and rules affecting pay, except that there are high spots which the men will not permit to be leveled down for the sake of standardization, and low spots which have been established by arbitration. The railroads admit that in the western and southern territories the daily rates of pay are higher; but claim that the rules affecting pay are almost as diverse in these two territories as the roads concerned. The roads admit that in the eastern territory a man must work longer hours, but the generally higher standard of equipment of the railroads, as compared with other territories, offsets the disadvantage to the men of longer hours by making the work lighter and less dangerous.

The railroads also urge that the statement of time consumed in the different territories is not comparable, without taking into account the overtime rules, and it is urged that the greater length of time apparently demanded of the men in the eastern territory, may be due to payments for preparatory time, for terminal overtime, and for overtime for special work, on a more favorable basis in the East than in either the southern or the western territories.

The railroads also show that the receipts per ton mile and per passenger mile in the three territories compare as follows:

	Ton Mile.	Passenger Mile.
Eastern .....	.646	1.779
Southern .....	.709	2.160
Western .....	.96	2.139

The railroads further show that the conductors and trainmen in the eastern territory receive for each ton-mile or passenger mile more than they receive in either the southern or the western territory.

Both of these results the railroads claim spring from the large number of short runs in the eastern territory, due to the greater density of population, runs for which a full day's pay is paid, although the run is less than the basic passenger run of 155 miles, or the basic freight run of 100 miles.

The railroads also challenge the justice of the wage scales existing in the West and in the South, as not having been proved; and for this reason they urge that to standardize wages in the eastern territory with wage scales that may themselves be inherently unfair, is both unwise and unjust. The railroads claim that these scales have been established, by the processes already described, and that these scales, therefore, are entitled to no consideration as standard scales.

Finding as to Standardization.—The Board must take the adjustment of 1910 as its starting point; it cannot be controlled by the argument for standardization, although it may be influenced by it. Standardization as to pay and rules, as between the eastern territory and the western territory, is at the present time impossible. Not only is the differential between the two territories as it affects the conductors and trainmen very large, but it is not clear that the policy of standardization which is favored in the East is responded to by the conductors and trainmen of the West. . . . The policy urged by the men in this regard is in the large interest of the railroads as well as of the public; so that progress should be made in this direction as fast

as circumstances will permit. In the universal conception of the day, interstate railroading is a national public utility; being such, uniform rates of pay for the same class of service are likely to prevail, sooner or later, in all parts of the United States where permanent natural conditions do not forbid. . . .

The rates which railroads are permitted to charge, both for passengers and freight, must in the opinion of this Board be adequate ultimately in all parts of the country to permit uniform rates of pay to be paid. The Board recognizes that freight rates and rates of pay have no direct connection with one another; because freight rates between competitive points are really determined by the competition. This Board has done what it properly can to standardize rates of pay between the eastern territory and the southern. This appears to be the more justifiable because wages in other trades in the South and in the East are substantially the same. From what has already been said, it is clear that the rules affecting pay in the eastern territory and in the southern territory are already standardized to a considerable extent. It may be broadly said, therefore, that, as a result of this proceeding, the rates of pay and most of the fundamental rules will be substantially standardized in the greater part of the service from the Mississippi to the Atlantic Ocean.

Increased Cost of Living.—The men make an exhibit showing the increased cost of food during the last decade. The railroads contend that this arbitration board should accept the adjustments of 1910 as the starting point; and they maintain that there has been no increase in the cost of living since that adjustment that would warrant any increase of pay at the present time; but they have not attempted to establish this claim by testimony.

The small amount of evidence presented by either side as to this subject has compelled the Board to reach its own conclusions from the unchallenged testimony as to the increased cost of food between 1909 and 1913. The Board assumes that the agreement with the Baltimore & Ohio which was made March 1, 1910, took fairly into account the cost of living as it stood at the end of 1909. Bulletin 132, Bureau of Labor Statistics, shows that the cost of living has increased at least 7 per cent., for men having incomes from \$800 to \$1,200 per annum. The Board therefore finds that there has been a substantial increase in the cost of living since the adjustment of 1910.

Increased Risk, Etc.—The men claim increased risk, labor and responsibility because of the longer trains and the larger cars, and in particular because of the great increase in certain parts of the eastern territory of the practice of using one train crew with two, three, four, and sometimes even five large engines.

The railroads admit the increase in length of trains, etc., but claim that the change from wood to steel in the construction of cars, and the installation of safety appliances, such as automatic couplers, airbrakes, and interlocking switches, have offset any increase of risk, etc.

The opinion of the Board is that the elements of risk and labor growing out of increased size of train and cars are practically offset by the safety appliances, etc. Employees' Exhibit, No. 4, shows down to June, 1909, the percentage of trainmen injured, including killed, in the eastern territory and in the United States as a whole, per thousand trainmen employed. These statistics seem to justify the conclusion that the number of trainmen killed on American railways is steadily decreasing in proportion to the number employed; and that in the eastern territory it is decreasing actually as well as proportionately.

It is not clear that the duties of the brakemen are any greater now than they were three years ago, but there has been a certain increase in responsibility placed upon the conductor with the increased length of passenger trains and the increased size of loads on freight trains, and the Board has taken this into account by increasing the pay of conductors in some instances more than it has increased the pay of brakemen.

Increased Productivity.—The men claim that the increased productivity of a train crew when caring for larger trains and

heavier loads than formerly is self-evident; and some portion of this saving should by right be given to the train crew.

The railroads ignore this argument, holding that any such increased productivity, whatever it may be, was met as it accrued in the wages fixed in 1910. They submit figures to show that conductors and trainmen receive more now per traffic unit than they did formerly.

It is the prevailing opinion of the Board that the extra productivity of the train comes from the increased number of engines, in connection with each of which an engine crew is paid for, and not to any measurable extent from any contribution to extra productivity by the train crew itself. This method of operation does not devolve upon the train crew, ordinarily, any increase of risk or any increase of labor under modern conditions, though the Board does recognize some increase of responsibility. In mine service, in some places, in which a train is drawn by two engines, a train crew is sometimes broken up in order that each half of the crew may serve each engine separately. In such service the prevailing opinion of the Board is that the train crew, as distinguished from the engine crews, does contribute to the increased productivity of the train, and the Board has had this reason in mind in transferring mine service, in the matter of pay, from the basis of the through freight service to the basis of the local freight service which is higher.

Profits and Wages.—The men have submitted carefully prepared tables which show that the railroads in the eastern territory are much more profitable than they were ten years ago. The railroads disregard this argument, but have pointed out that fixed charges are constantly being increased.

The Board has been both interested and instructed by these exhibits, but the railroads have made no plea of inability to pay, and the Board finds itself unable to relate the facts contained in this class of exhibits to the question of wages in such a way as to found thereupon specific increases in rates of pay.

Miscellaneous.—The railroads declare that the conductors and trainmen already receive much better pay than other skilled labor. The conductors and trainmen challenge the bearing of this exhibit, without further development, and point out that their occupation is exceptionally hazardous; that they are unable to buy life insurance, so that they are obliged to furnish it through their own organizations on the mutual plan; that more than one in ten of all trainmen, including in this term with the conductors and brakemen the engineers and firemen, is injured every year; and that, while, the railroads often keep men in their employ until they are old, the men if they receive an injury, or if they are dismissed for cause, find it exceedingly difficult to continue in the railroad business, except at greatly reduced pay, if at all.

The men claim that the conductors and trainmen receive larger pay per mile in the eastern territory than in the western, that the pay per mile traveled does not afford a fair comparison; because the comparison thus made is on a mile basis, while, as a matter of fact, the railroads in the eastern territory practically pay on an hour basis, and the railroads in the western territory on a basis of mileage. In the month of October, 1912, in the fast through freight service, the men were on duty nine hours and thirty-eight minutes, while in the slow freight service they were on duty eleven hours and forty minutes; in the local and pick-up service twelve hours and four minutes.

The railroads further urge that on account of the full crew bills passed by a number of the legislatures, any increase of pay given to brakemen constituting such crews should be so adjusted as to provide for lower rates of pay to each of the two brakemen than was formerly given to the one brakeman. To this the men reply that such legislation exists in twenty states of the Union, and that of these states only five are in the eastern territory, and that in the other fifteen states no such discrimination as to pay is made.

In regard to the argument that the conductors and trainmen already receive much better pay than other skilled labor, the Board is of the opinion that the offsets suggested by the men as

to the risks of their occupation, and the necessity which is upon them to insure themselves because they cannot buy insurance, are a sufficient answer. It is to be said, moreover, that the traveling public, as well as the employees themselves are dependent for safety upon the efficiency and fidelity of the brakemen as well as of the conductor. It is distinctly in the public interest that the men entrusted with such a charge should be well paid; for unless they are, the service will fall into the hands of men less capable of doing it well. In his closing statement for the railroads Mr. Elisha Lee says: "All will, of course, agree that the first charge upon railway revenue must be fair payments to employees."

. . . The men in the East are obliged to work from one hour to two hours a day longer than they do either in the West or in the South to earn the same money. The lay members of the Board are unable to express a technical judgment upon the question; but they confess themselves perplexed by being told that where population is greatest and cities nearest to each other, and where the amount of freight to be handled is the largest, that there the men should find it necessary to work longer hours than in the more sparsely inhabited parts of the country in order to earn the same amount of money.

In regard to the full crew bills the prevailing opinion of the Board is that it is not the function of the Board to attempt to correct mistakes of the legislature, if such mistakes have been made. It is in the interest of all concerned that any modification of the existing situation should be brought about by agreement between the management and the men, if possible.

Overtime.—The men have asked for a new rule to provide for the payment of overtime at time and a half, instead of as now, pro rata. The Board is in sympathy with the expressed desire of the men to reduce overtime as much as possible, and it recognizes that the payment of time and a half for overtime is a well-established custom in the building trades and possibly in some other trades. But, wherever it prevails, so far as the Board is aware, the determination as to whether overtime shall or shall not be paid for, rests with the employer. In railroading, it is quite evident that in many cases neither the management nor the trainmen can prevent overtime; and it appears to this Board, therefore, that punitive overtime, as it is called, is an unsound principle when applied to the running of trains. The Board hopes that some other method can be devised for reducing overtime; for it does earnestly believe that the hours demanded in slow freight and construction service are unreasonably long. If no other remedy can be found, possibly punitive overtime should be tried; but this Board does not deem it wise to adopt this rule at the present time.

As to overtime in yard service, the intermediate members of the Board are less clear, because they are less sure that overtime in yards is beyond control of the management. They have declined the rule in yard service, however, partly because it has been recently disallowed by an arbitration in Illinois, and partly because, not being itself sure, it has seemed to the Board unwise to disturb existing arrangements.

Passenger and Freight Rates.—This Board has no authority to determine the passenger and freight rates to be paid in the eastern territory; and must make its finding as to what is a proper rate of pay without any reference to the dilemma in which the railroads are evidently placed by the laws which make it impossible for them to increase passenger and freight rates. . . . To take any other view of the question would be to decide that no increase of pay, while the laws remain as they are, can ever be made except voluntarily by the railroads. We have the cheapest railroad service to be found on the face of the globe. In the face of such a fact, it would be unjust to say that railroad employees must continue to be satisfied only with what can be paid from freight rates as low as ours.

Safety.—One other factor this Board believes should be called vividly to the attention of the Interstate Commerce Commission. The connection between the decrease of hazard, the danger to

life and limb, through the installation of safety appliances, by the substitution of steel for wooden cars, by double tracking, by increasing railroad facilities, as railroad business increases, appears to this Board to be direct and not indirect. The statistics submitted to this Board demonstrate that the number of trainmen killed on American railroads has grown smaller proportionately during the last few years while these safety appliances have been progressively installed; and in the Eastern District, the number of killed has decreased actually for the last few years down to 1909, which is as far as the separate figures extend. Since then the figures are not available for the Eastern District by itself.

The percentage of injuries has increased slightly pro rata to the number of men employed during the last two or three years; but the average is not greater than it has been in several years of the previous decade. As has been already pointed out, every period of specially active business is marked by an increase of casualties, due apparently to the employment by the railroads, at such times, of large numbers of unskilled men. Every panic is followed by a marked falling off in casualties, due presumably to the discharge of the less competent men. . . . New means of safety cost in the aggregate an immense sum of money. Any policy that would make it impossible for the railroads to command this sum of money would be a profound misfortune to the whole nation. Such a policy would be bad enough in its effect upon transportation, because it would reduce the efficiency of the railroads; but it would be criminal, in the sense that it would make the great army of railroad employees, who are numbered by hundreds of thousands, follow their hazardous occupation under conditions more hazardous than are necessary, and, indeed, more hazardous than are justifiable in a country like this.

"Saving Clauses."— . . . Among the articles submitted for arbitration are three, lettered "D," "P" and "Q," which are called by the men "saving clauses." The board has agreed that these articles should be accepted as having the significance which was conceded to them in earlier arbitrations. They have very greatly affected the action of this Board; for these articles make standardization within the district impossible unless it be standardization upward. It has not seemed reasonable to this Board, therefore, to remove low spots which were created by arbitration only three years ago, when it is not permitted, under the terms of these articles, to remove high spots.

The present proceeding has been in every sense of the word an arbitration. Many proceedings of the kind are, in effect, little more than formal compromises; but in this proceeding the intermediate arbitrators have been obliged to pass upon the merits of every article as proposed. The result is that, in most cases, each article as adopted has been adopted by a vote of four to two, although the majority represents at times the intermediate arbitrators and the representatives of the men, and at other times the intermediate arbitrators and the representatives of the railroads. . . .

The percentage of increase in pay granted in the passenger service is not large. The mileage rate for conductors is that requested by the men and is identical with the rate in the South, and the differential between conductors and brakemen is the same as there obtains.

The awarded rates of pay in local freight service while considerably less than those asked are the same as are now paid in the same service in the South for conductors, and also for brakemen.

In through freight service the rates asked for are again the Western rates. The rates awarded approximate but do not reach the Southern rates. If it had been possible to discriminate between fast freight and slow freight service the Board would have been disposed to place slow freight on the Southern basis.

In yard service, although the hours are long, the present rates of pay in first class yards in the East are already within 2½ per cent. of existing Chicago rates. The Board preserves the exist-

ing classification of yards in the East, and advances the pay in all classes of yards by 1 cent an hour, which places the first class yards in the East upon the present Chicago basis.

In regard to the proposition of the railroads that the justice of the wage scales existing in the West and in the South has not been proved, it must also be said that the justice of the wage scale prevailing in the East has not been proved.

Articles A, B, C.—Passenger conductors, minimum 155 miles, 29 cents a mile; ticket collectors 23, baggagemen 1.65, rear brakemen 1.6, other brakemen, same. On runs less than 155 miles a day, conductors \$4.50 a day; collectors \$3.57, baggagemen \$2.75, rear brakeman \$2.60, other brakemen \$2.55. On short runs, the minimum work day is 8 hours within 12 consecutive hours. Overtime after 8 hours work within 12 hours; layovers less than 1 hour not to be deducted. Overtime rates: Conductors 45 cents an hour, collectors 35.7, baggagemen 27.5, rear brakemen 26, other brakemen 25.5. Special provision is made for "other passenger trainmen," but what class this refers to is not stated. Regularly assigned passenger trainmen are entitled, subject to certain conditions, to the following minimum rates per month, exclusive of overtime: Conductors, \$135; baggagemen, \$82.50; rear brakemen, \$78; other brakemen, \$76.50.

Article D.—This forbids reductions in crews or increases in mileage to offset the increase now granted; but short turn-around runs may be rearranged to prevent excess mileage, provided no crews are taken off.

Article E.—This prescribes percentages for increasing the pay for special services not covered by the standard rates; for example passenger conductors, 8.2 per cent.; brakemen, 6.7 per cent.; local freight conductors, 13.2 per cent. (eight different percentages). The award of 1910 is confirmed in certain minor particulars.

Article F.—Through and irregular freight, minimum 100 miles, either straightaway or turn around; conductors, 4 cents a mile; rear brakeman, 2.67; other brakemen, same.

Article G.—Way freight, etc., conductors, \$4.50; rear brakeman, \$3.00; other brakemen, same.

Article H.—This was a separate demand for work trains, wreck trains, etc. It is covered by article F (through freight service).

Article I.—In all road service except passenger, 100 miles or 10 hours is the minimum day. Crews may be assigned to short runs, but not after having been on duty 10 hours.

Article J.—Milk trains, helpers, etc.; covered by Article E.

Article K.—Regular way freight and work train crews guaranteed 100 miles or 10 hours each working day, including holidays; but if an act of God makes service impossible the guarantee does not apply. Crews may be assigned to other service to complete the guarantee.

Article L.—Deadheading: existing schedules to remain unchanged.

Article M.—Provides for pay of freight men when held away from home more than 18 hours.

Article N.—This denies the demand for time and one-half where a train has more than one engine.

Article O.—Classification of yards remains unchanged: Pay increased 1 cent an hour, but not to make a rate exceeding the Chicago standard. Overtime pro rata (not time and one-half).

Article P.—A man's earnings shall not be diminished; but no man shall secure an increase by combining old rates with new conditions, or new rates with old conditions. Demands under this article must be properly formulated by the brotherhood committees acting jointly; and must be uniform for each set of runs.

This and certain other matters may be referred back to the arbitrators if no agreement can be reached.

Article Q.—No existing agreements are changed except as specifically stated.

DISSENTING OPINIONS.

Both of the minority reports testify to the fairmindedness of the neutral arbitrators. Messrs. Atterbury and Smith declare that standardization is chimerical and uneconomic; that the increase in cost of living does not justify the 7 per cent. granted; that increased responsibility "an intangible thing" has not been proved; that the six millions means the interest on 120 millions, which capital is sorely needed for improvements imperatively demanded for the safety of the public; that, because of the full-crew laws, the burden is not six but ten millions; that this new burden makes it harder to deal equitably with other [non-union] classes of employees; that this decision will bring on new demands, strike votes, public anxiety, mediation, arbitration and compromise. The endless chain will continue. It is agreed that some government body should study wages.

Messrs. Sheppard and Cease complain that wages in other territories were not sufficiently considered; that pay-and-half for overtime and for double heading are two "great principles," founded in justice, as train delays are not due to the fault of the men; that injustice was done by not going back of 1910; that Articles D and P were not intended to be submitted to arbitration; and that the decision on yard rates has been unduly influenced by rates in the South, which are affected by racial competition.

WHAT A LOCOMOTIVE BURNS.—The problem which confronts the railway officer in considering this subject is an extensive one. To obtain from the modern locomotives the average power required from them it is necessary to consume fuel at the rate of about 100 lbs. of coal per square foot of grate per hour, and to obtain the maximum power required it is necessary to consume 150 lbs., and at times in excess of this amount, per square foot of grate per hour. That is, to obtain the power necessary to perform the work demanded, a boiler which from its heating surface would be rated at about 320 h. p. is frequently forced to develop over 1,500 boiler horse power, and our records show that another boiler which would on the basis of heating surface be rated at about 400 h. p., has developed as high as 1,994 boiler horse power. The performance stated above requires coal consumption at the rate of from 6,000 to 10,000 lbs. of coal per hour, and this has been done on a grate of 55 square feet.—D. F. Crawford before the International Society for the Prevention of Smoke.

ENLARGING STATION AT MELBOURNE, AUSTRALIA.—Owing to the remarkable expansion in the Melbourne suburban passenger traffic the accommodation at Spencer street station is becoming congested and it will become worse as the population increases. Extensions and improvements have been effected, but there is a general desire to see the old building demolished and a new building, designed to meet the demands of modern traffic, substituted. The idea of the commissioners in carrying out further additions and alterations is not received with satisfaction since, however much the new improvements may fit in to assist the urgent demands for space, the design and layout of the old structure have traffic drawbacks which militate against permanent usefulness. Architecturally, too, the station is gradually drifting into a sort of patchwork job, and is unsightly as compared with other city structures. It is now proposed to convert the No. 10 country platform into a double-faced platform, so that two trains might be prepared for despatch at the one time. The No. 9 (old Essendon) platform is to be extended to a total length of 800 ft., so as to provide additional accommodation. New ticket offices, with provision for 12 windows, are also to be erected. It is stated that the extension of the station will enable three trains for the Northeast being docked at the one time, thereby removing the present inconvenience. Under the proposed conditions passengers will be able to board trains as soon as they reach the station. It is anticipated that the alterations will be completed in time to meet the Christmas traffic.

W. C. NIXON AND THE FRISCO.

W. C. Nixon, formerly vice-president in charge of operation and maintenance and recently receiver and chief operating officer of the St. Louis & San Francisco, was elected president at the annual meeting of the stockholders on November 10.

The election of Mr. Nixon shows that those now dominant in the affairs of the Frisco accept the view expressed in this paper when the road went into the hands of a receiver, namely, that its troubles are due to financial and not to operating causes. The Frisco is heavily bonded relatively to the density of its traffic and the amount of its earnings. Furthermore, in acquiring control of the Chicago & Eastern Illinois and of the lines running from New Orleans to Brownsville it assumed additional heavy burdens. Only the skillful handling of the property by the officers in charge of its operation enabled it to carry as long as it did the loads piled on it by those responsible for its financial management. The election of Mr. Nixon as president of the company is a partial reward for his efficient and economical handling of the operating department, as vice-president and subsequently as chief operating officer under the receivership. It does not seem unsafe to assume, in view of recent developments, that after the receivership is ended, he will be continued as president.

It is very questionable whether it will prove to be expedient for the road to pass out of the hands of the receivers without a substantial scaling down of its funded debt. If all of its obligations other than those of the Frisco proper are got rid of its capital will still, we believe, consist of only about \$21,000,000 of preferred stock and \$29,000,000 of common, as compared with about \$210,000,000 of funded debt. On this basis its funded debt per mile will be in excess of \$41,000, which is altogether too much to ask any road earning only a little more than \$8,000 a mile gross to carry. Under these conditions fixed charges are bound to be so great as to interfere with adequate expenditures for maintenance and improvements, and as long as adequate expenditures cannot be made for these purposes, the property cannot be operated with satisfactory efficiency and economy.

However, whether the fixed charges are to be scaled down as they ought to be or not, there could hardly be found any man better fitted to deal with the Frisco's problem than Mr. Nixon. He has ability, energy, perseverance and patience—all of them qualities that are indispensable to the successful handling of a property like the Frisco. He is a practical railway man in the truest sense of the word, having risen from the ranks through all the grades of the operating department; and at the same time he avails himself of all the new methods, statistical and otherwise, that have been developed in recent years to promote efficiency. He fully appreciates the economies to be effected by increasing the train load and has used them so effectively that between 1906, when he went to the Frisco, and 1912 the revenue

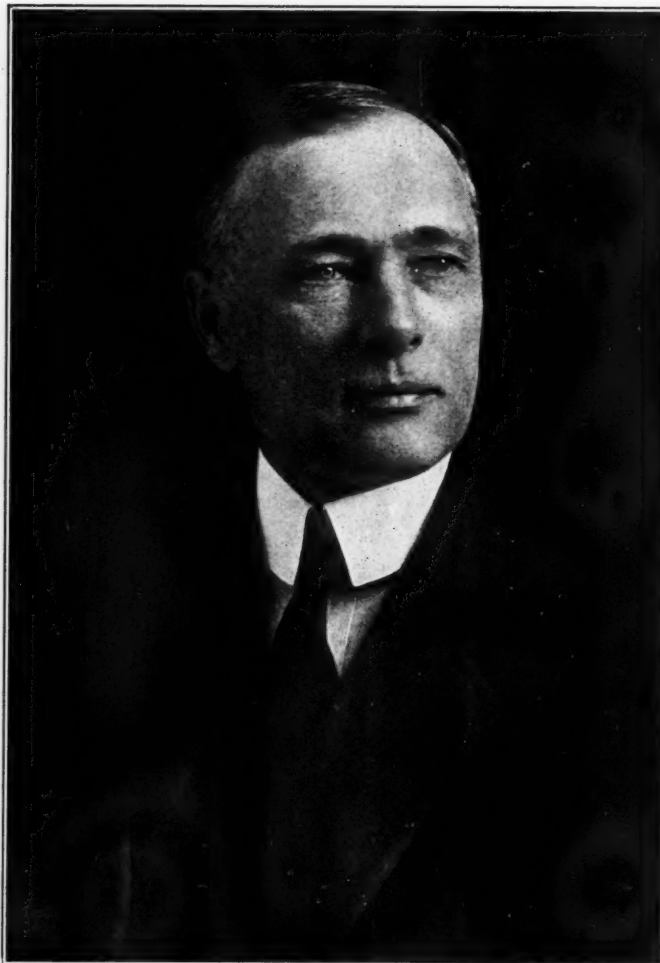
trainload was increased from 214.5 tons to 255.2 tons, and the total trainload from 242.2 to 298.1 tons, in spite of the fact that the road did not have sufficient money with which extensively to reduce grades, and buy more powerful locomotives. At the same time, Mr. Nixon has shown the keenest appreciation of the advantages to be gained by economies in little things.

While seeking to save the road money by the use of economical methods, he has co-operated vigorously with the traffic department in trying to increase earnings by giving good service. The new system of handling loss and damage claims and the new method of handling merchandise which have been adopted have been described from time to time in these columns. With Mr. Nixon in charge the operation of the Frisco will be in good hands. It is to be hoped, however, that the financial management of the property will prove to be in equally good hands, and that this will be shown by a readjustment of its finances which

will give those directly charged with its operation a real opportunity not to only operate it successfully, but also to develop it along the right lines.

Mr. Nixon was born in February, 1858, in Illinois, and entered railway service at the age of 20, in 1878, with the Burlington & Missouri Railroad in Nebraska. After nine months with this road he became connected with the Atchison, Topeka & Santa Fe, and was consecutively watchman, clerk, cashier, agent, chief clerk in the superintendent's office, trainmaster, material agent, division superintendent, and to July, 1896, superintendent of terminals at Chicago. From July, 1896, to January, 1897, he was general agent of the freight department, and from 1897 to January, 1900, superintendent of the Chicago division of the same road. He was then for two years general superintendent of the Gulf, Colorado & Santa Fe; from January, 1902, to June, 1904, general manager, and from June, 1904, to August 1, 1906, second vice-president and general manager of the same road. On August 1, 1906, he left the Santa Fe to become vice-president and general manager of the St. Louis & San Francisco. In May,

1911, his title was changed to vice-president, in charge of maintenance and operation, which office he held until he was appointed chief operating officer, and later receiver during the present year.



W. C. Nixon.

SIERRA LEONE RAILWAYS.—The Sierra Leone Government Railways are in the unusual position amongst African Railways of having a 2 ft. 6 in. gage, which has been found perfectly capable of carrying the traffic offered. On the main line, which runs from the Port of Freetown to Pendembu, the maximum grade is 2 per cent. (compensated) and the sharpest curve is 17 degs. There is also a mountain railway from the Freetown terminus up the Lion Rock, a distance of six miles, which is worked by adhesion and has a general grade up the mountain of 3.33 per cent.

OVERLOADING FREIGHT LOCOMOTIVES NOT ECONOMICAL.

By J. S. SHEAFE,

Engineer of Tests, Illinois Central.

The rate of increase in railroad mileage has been so rapid that perhaps the time necessary for improving conditions to effect the most efficient handling of freight trains has not been available. Each operating day has brought its own great number of problems requiring immediate solutions. Emergency conditions have prevailed. Does the overloaded engine mean maximum efficiency?

In order to reduce the whole question to a percentage basis some figures are presented for consideration in the belief that they are correct. As city traffic increased, it became necessary to start the humane society, in order to save the horse. This indicates that the human tendency is to put on all the carrier will bear. It always has been, and always will be thus. As a general thing locomotives in this country are overloaded, and most of them are pooled. Both of these conditions mean expensive operation, and how expensive can only be known by those who are closely in touch with engine and train crews.

To begin with there is so much tonnage each month to be moved. The cheapest operating cost must lie somewhere between a locomotive struggling with an overload and a fair sized train making a quick run. Losses of time due to poor despatching cannot be overcome except by treating individual cases, as with any other man failure.

A freight locomotive is variously estimated as being worth from \$25 to \$100 a day; hence the assumption that it is worth \$50 a day is not unreasonable. As this locomotive spends approximately one month out of every twelve in the shop undergoing heavy repairs, and much more standing in roundhouses, in addition to other time losses, such as standing on sidings, the actual time used in hauling freight will be found to be rather a small percentage of the whole.

As an illustration, a certain locomotive, rated at 3,500 tons, requires, with good luck, 12 hours to make a district 120 miles long, with a coal consumption of 20 tons. Under favorable conditions, and with such an engine making 25 single trips per month,

$$25 \times 3,500 \text{ tons} = 87,500 \text{ tons moved.}$$

Assuming the engine to work 25 days a month, this will cost roughly:

Engine crew (\$9.15 x 25).....	\$228.75
Train crew (\$11.25 x 25).....	281.25
Coal (20 tons x \$2 x 25).....	1,000.00
Engine (\$50 x 30).....	1,500.00
Cost of repairs (3,000 miles x 12c.).....	360.00
Total	\$3,370.00

which means about \$38.50 per 1,000 tons hauled 120 miles. Reduced to an hourly basis it would be in service, 12 hours x 25 trips = 300 hours, and would haul at the rate of 292 tons per hour on the road.

Only 25 trips per month are possible, as the 12 hours running time is not always met. The overtime consumed will prevent over 25 trips being made. With conditions as above the 120 mile trip can be made with 3,000 tons in 8 hours and on 15 tons of coal. Tonnage has then been reduced 17 per cent., but running time has been reduced 33 per cent. and the coal required 25 per cent. In this case it is very evident that the engine can make more than 25 single trips per month. Allowing a 12 hour layover at each end of the district it can make 36 trips with a total time on the road of 8 hours x 36 trips = 288 hours to haul 36 x 3,000 tons = 108,000 tons. This amounts to 375 tons per hour on the road, an increase of 28.4 per cent. This will cost:

Engine crew (\$9.15 x 36 trips).....	\$329.40
Train crew (\$11.25 x 36 trips).....	405.00
Coal (15 tons x \$2 x 36 trips).....	1,080.00
Engine (\$50 x 30 days).....	1,500.00
Repairs (4,320 miles x 12c.).....	518.40
Total	\$3,832.80

which would mean approximately \$35.50 per 1,000 tons hauled 120 miles.

This comparison therefore shows a direct saving of \$3, or 8.5 per cent. in cost per 1,000 tons hauled 120 miles and an increase of 83 tons hauled per hour on the road, or 28.4 per cent. A direct saving also is the reduced cost per mile for engine repairs. This is demonstrated by the fact that passenger engines invariably cost less than freight engines, although kept up in better shape. The passenger engine is never loaded to such an extent that it cannot quickly "wheel" its train and carry it at a high rate of speed. This item would, therefore, further reduce the above cost of hauling 1,000 tons per 120 miles.

Extremely long trains, now common, increase the number of break-in-twos. This results from the fact that locomotive tractive effort has increased in a greater ratio than draft gear strength. It is a wonder that more drawbars are not pulled out.

Human nature is such that when things begin to go wrong interest in a perfect performance is lost, and in some cases, aggravated ones of course, wilful damage to equipment is administered, just as a man when he is angry will sometimes kick a dog when it gets in his path. In other words, interest and consequent energy are increased by the square with a smooth trip. Break-in-twos requiring the carrying of chains from the caboose for the length of 65 cars or so have a demoralizing effect. The effect on crews of a quick run is good. It means that they get the same money for a fraction of the time usually required.

In the cases under consideration, 87,500 tons are moved in the first one, as against 108,000 tons in the second. This is an increase of 20,500 tons or 23.4 per cent. in the amount of work done by the engine, and means that the work now requiring 27 engines would be done by 22.

There are many objections to be raised against the overloading of an engine but it is not necessary to dwell upon them. The terrific strain on every staybolt, bolt and part is evident always; the tearing of the fire with consequent flue leaks is expensive.

If the modern locomotive appliances increase economy and power why not apply them for the sake of better operation rather than for the purpose of putting more cars on the rip track? As the standard draft rigging today is too weak for the heavy demands put upon it, it would appear that operating efficiency can be increased more by lightening tonnage than by constantly adding to it.

Can there be any other item of economy in the hauling of maximum tonnage than a supposed saving of crew wages by managing to get an extra few hundred tons over the road? In the above cases it costs approximately \$20.40 in wages to get any sized train over the district, if no overtime is paid. Neglecting all other items of expense and considering the difference between 3,000 and 3,500 tons hauled, and in the same ratio, if the overtime amounts to \$3.33, or somewhat less than 2 hours, the wage cost is the same per 1,000 tons hauled. The hidden costs are many, however, both direct and indirect.

The loss in available cars, when needed most, will be found of importance. As a modern Mikado locomotive costs \$23,000, and is worth to a company \$50 per day, it would be expected that a box car costing about \$1,200 would be worth \$2.60 per day. As the average movement for box cars on the road in question was 21.06 miles per day (in 1912) it would require, with this mileage, over 47 days to go 1,000 miles. The C. L. rate being \$1.10 for this distance and a minimum of 20,000 lbs. being in the car, the amount earned would be \$220 or about \$4.60 per day if the car is carrying a load at all times, which it is not.

Slow movement is hard on the shipper alone if there are plenty of cars, but if business is diverted on account of a car famine the loss is felt by all concerned. If the running time can be cut down one-third (probably only possible by tonnage reduction), the car movement would be increased in this case from 21.06 to 27.84 miles per day. This means earnings of \$6 instead of

\$4.60 per day, for the time the car is hauling the minimum load. As the running time with 3,500 tons is 12 hours (best time), it should require 100 hours actual running time to make the 1,000 1,128 hours required (on basis of 21.06 miles per day), there is an miles exclusive of yard delays. With the time of 47 days, or apparent standing time of 1,028 hours. In other words, if the car travels 10 miles per hour, during the running time and on the above basis, it moves less than 9 per cent. of the time and stands waiting in yards over 91 per cent. of the time. This, of course, includes all loaded and empty cars in yard delays, storage, repair tracks, demurrage cars, etc. If it is figured in any other way, even to allowing the daily mileage of 36, as was reached by one railroad for a short time under favorable conditions, the difference between running and total time is startling.

As cause precedes effect some reason or reasons for such a condition must exist and be evident. It has been said of a certain western railroad that, during a blockade which had become chronic, one superintendent cleaned up his division by despatching lighter trains, thus increasing crew and locomotive efficiency. As caboose mileage will be found about three times that of a freight car it follows that yard delays come to the latter but not to the former. Extreme yard delays which are recognized generally as a most expensive condition and one which has been standard practice for many years is perhaps responsible for some of it.

Operating officers have for so many years been accustomed to increased tonnage that it has become a habit. It is custom, and custom is stronger than the law. Yard delays result from several causes, one of which is overloaded trains. Disregarding the added penalty on the road resulting from this, it can be seen that if an engine is rated at 3,500 tons out of a division terminal, 3,500 tons it must take or a lot of explaining follows. If 2,900 tons are ready at 6 p. m. and nothing in sight we have a case of 600 tons, or 17 per cent., causing an added delay to 2,900 tons, or 83 per cent. The 2,900 tons occupy considerable track room and if the yard is almost full conditions are aggravated. The only thing looked for is to have an extra 600 tons gotten over the division for the same wages as the 2,900 tons would cost. But it doesn't work out this way. The heavy train wants some overtime and a few drawbars and usually gets them.

If a train arrives during the night with full tonnage it gives over the necessary 600 tons and the remainder gets in line for

next out. Many times during the rush season a freight train stands on the main line or on the first available siding waiting for room to be made for it. If it was shorter the necessary space could be sooner obtained and on the other hand if the despatcher was not holding outgoing ready cars in order to "fill out," such delays would be practically eliminated.

Bad orders resulting from too heavy and too long trains which are brought in by chains or which are left in sidings, and which sometimes require the load to be transferred, cause both increased delay and expense and reduced average mileage. In considering bad orders sight is not lost of the number made each working hour in the yards and which cannot be attributed to excessive tonnage. However, a sufficient number of cars are damaged on the road to warrant an investigation into just what this extra "wage saving" costs.

Not long since an operating official quoted damage done in yards at not more than ten per cent. of the total. "Damage," not to be confused with failure, is rarely found in a train of manageable size.

There are many yards where trains are made up with the cars as they come. At other points heavy cars go next to the engine with flats and empties just ahead of the caboose. It is safe to say that if a train is improperly made up, i. e., with light and heavy cars mixed, time would be saved by switching the heavy loads ahead where they should be.

Car shortages could possibly be lessened if the "fill out" idea was somewhat modified.

GAS-ELECTRIC LOCOMOTIVE.

The latest application of the idea of gas-electric propulsion the railway work is the 57-ton locomotive recently placed in service by the Minneapolis, St. Paul, Rochester & Dubuque Electric Traction Company, perhaps better known as the "Dan Patch" Line. This road has been operating a heavy passenger business from Minneapolis to Northfield, Minn., for several years entirely by gas-electric cars. The freight traffic and excursion passenger traffic had grown so heavy that it was felt a locomotive would be needed and consequently the gas-electric locomotive, shown in Fig. 1, was purchased. The locomotive was built at the Erie, Pa., works of the General Electric Com-

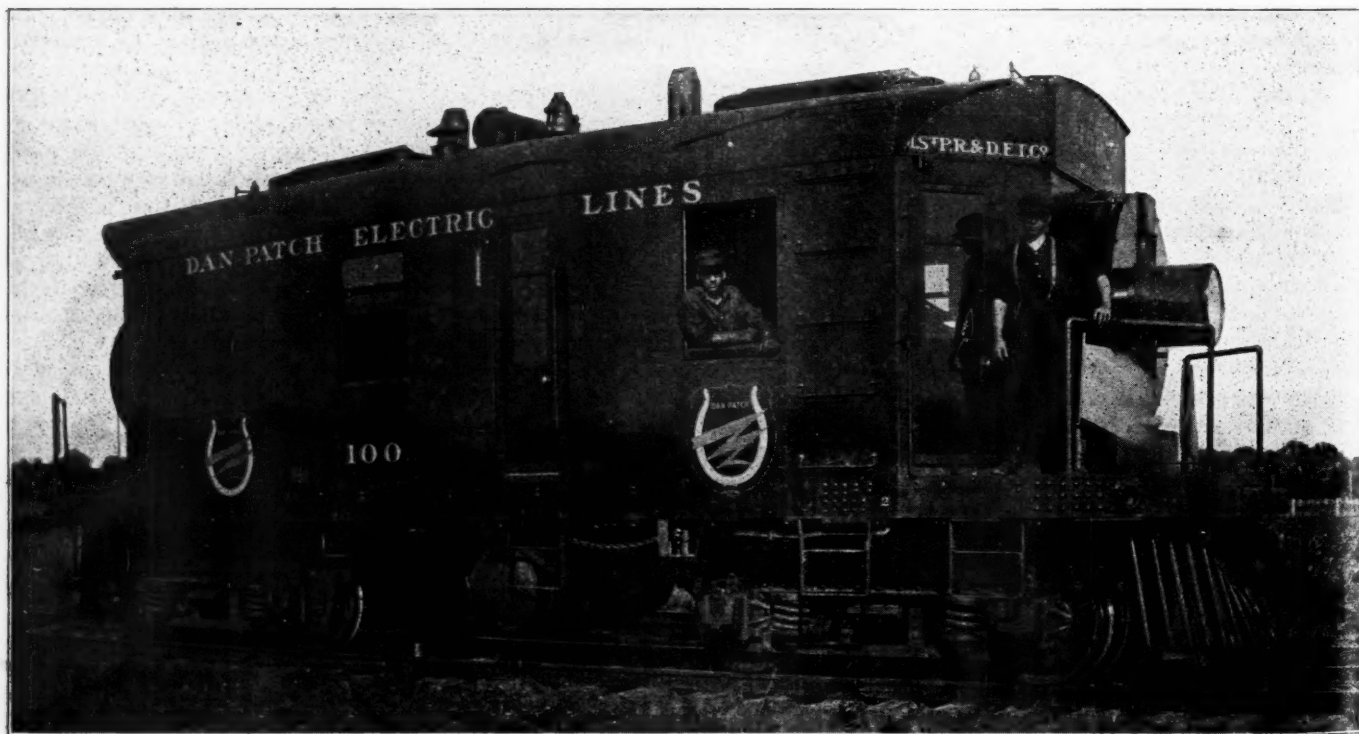


Fig. 1—Gas-Electric Locomotive for the Dan Patch Lines.

pany and was run under its own power from there to Minneapolis. Since being placed in service in July, it has been in constant service and has proved successful in every respect. Although the locomotive is rated at 38 m. p. h. it has attained a speed of 51 m. p. h., running light, and 45 m. p. h. with a 5 car train. This performance, however, is not to be recommended for regular schedules. The fuel consumption when using "motor spirits" has been found to be about one gallon for 95 ton miles.

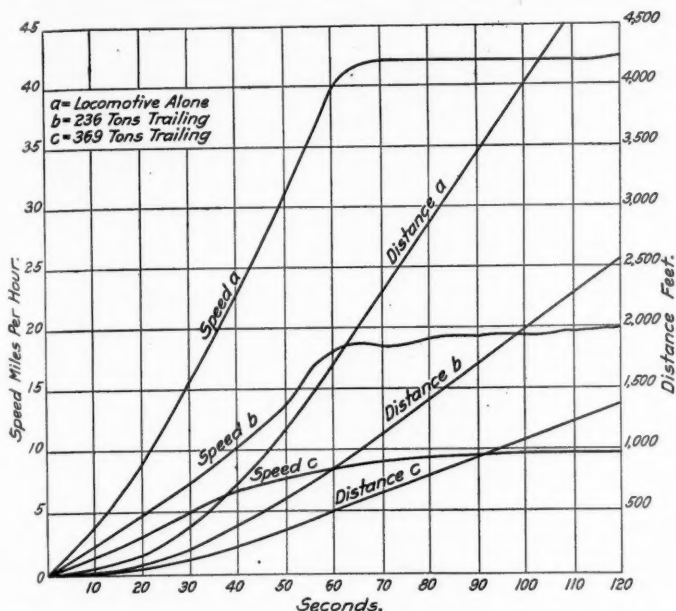


Fig. 2—Acceleration Tests of Gas-Electric Locomotive on a Level Tangent.

The results of three actual acceleration tests of the locomotive light and with train are given in Fig. 2. This diagram shows the speed attained and the distance covered at the end of various periods of time.

The power plant for the locomotive consists of two standard sets such as are used in gas-electric cars, run in parallel. Each of these sets consists of a 175/225 h. p. 8 cylinder V-type gasolene engine running at 550 r. p. m., direct connected to an 8-pole 600-volt interpole direct current generator. The control is so arranged that either one or both of the engines may be used in

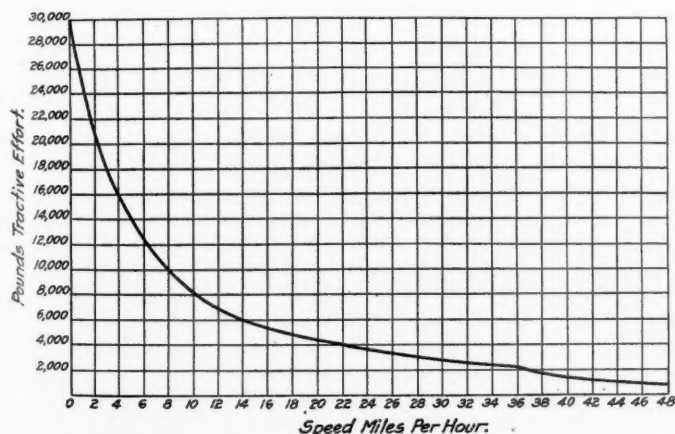


Fig. 3—Available Tractive Effort; 57-Ton Gas-Electric Locomotive.

the operation of the locomotive. There is no trouble about the load dividing equally between the two generators when both are in use, as the generator which tends to run at higher speed will tend to take a greater share of the load and will consequently slow down until it is running the same speed as the other unit. The power plants are started by air in the same way as on the gas-electric cars with the additional feature that after one set is

running the second may be started from the first electrically.

The control of the equipment is similar to the standard gas-electric car except that four motors are used instead of two. The motors are placed in pairs connected permanently in parallel and these pairs may be put in series or parallel. The controller provides seven points in the series position and six points in the parallel position. There are also two additional points for shunting the motor fields, thus making fifteen running points in all. The control of the engines is by manual operation of the throttle valves. Four 100 h. p. 600 volt interpole motors are used, being suspended directly from the axles and driving through a gear reduction of 3.41. The tractive effort obtainable at various speeds is given in Fig. 3.

The locomotive is equipped with a 5 k. w. 65 volt gasolene engine driven lighting set, which furnishes energy for train lighting, as well as headlights and cab lights. A 25 cu. ft. electrically driven air compressor is provided, which operates on the 65 volt lighting circuit and provides for pumping up the initial charge of air for starting the main engines. The main engines are each provided with 22½ cu. ft. air compressors. A coal fired hot water heater is provided in the cab for train heating or for keeping the engines warm during layovers in winter.

The principal features and dimensions are as follows:

Gage	4 ft. 8½ in.
Length, inside knuckles	36 ft. 4 in.
Extreme width	10 ft. 5½ in.
Extreme height	14 ft. 6½ in.
Length over cab	27 ft.
Length between truck centers	20 ft.
Total wheel base	26 ft. 10 in.
Rigid wheel base	6 ft. 10 in.
Minimum radius curve	100 ft.
Trucks	Swing bolster type
Wheels	M. C. B. rolled steel
Wheels, diameter	33 in.
Axles	6½ in.
Journals	5½ in. x 10 in.
Weight on drivers	114,000 lbs.
Total weight	114,000 lbs.
Cab	Steel box type, removable ends
Frame	Open hearth steel
Air brakes	G. E. straight and automatic type
Sanders	Air operated
Bell	Locomotive type with air ringer
Whistle	Air operated
Headlight	Incandescent type
Fuel tank capacity	300 gals.
Steps, pilots, draft rigging, grab irons, etc., conform to I. C. C. and M. C. B. practice.	

DEMURRAGE IN ENGLAND.—Following conferences with shippers and receivers of freight, the railways of England and Wales have modified their rules regulating the collection of demurrage on freight cars at private sidings. A car which is set to be loaded may be held two days, besides the day on which loading is begun, instead of one day, as heretofore; while the consignee is to have three days' free time, exclusive of the day of arrival, instead of two. On freight which is to be transferred to vessels at the seacoast, the allowances are still more liberal. The standard demurrage charge on these roads is one shilling, sixpence, per wagon per day.

RAILWAY CONSTRUCTION IN GERMAN SOUTHWEST AFRICA.—Though German Southwest Africa is the only German colony possessing a good and complete railway system, railway construction there is by no means at a standstill. It appears that there are three railway lines which are urgently needed in the colony. The first is a line into Amboland, which should do much towards the development of that territory; this project has already received the sanction of the Reichstag. Secondly, there is need for an extension of the Swakopmund-Windhuk line to Gobabis, about 62 miles from the Anglo-German frontier. The district through which it is proposed to run this extension is remarkable for its extreme fertility. Farmers who have already exploited this rich territory have failed previously, as they were unable to dispose of their produce owing to the lack of means of communication. The third line is to be an extension of the Lüderitzbucht railway to Keetmanshoop and to Hansuur, it will unite Lüderitzbucht with the railway system of the Union, South Africa.

MR. MELLEN SPEAKS OUT.*†

Practically all the turmoil that has surrounded every move made by the New Haven in the last ten years has been stirred up by Boston bankers who were desirous of controlling the New England trolley field. Of course, there developed additional opposition in the case of the Boston & Maine acquisition; many honest people fought our plans of expansion because they were honestly opposed to it. . . .

The New Haven, long before I took charge, had been in the trolley business. The electrical lines are natural feeders: I simply pursued the same policy of developing this feeding system; and in acquiring additional lines I stepped on the toes of the people who control the Boston elevated, the Massachusetts electric companies and the Boston & Worcester Street Railway. They fought us tooth and nail. They raised the cry of monopoly against the New Haven, although at the same time they were trying to monopolize the field for themselves.

The New Haven policy met with no opposition in Rhode Island or in Connecticut, or in Massachusetts, for that matter, outside of Boston and vicinity. The people in the districts where we bought the trolley lines made no opposition because they knew we were improving the service.

I worked to develop this policy of expansion because I believed in it. I believed that the elimination of duplicate managements and expenses of superintendents and the welding of all parts of the transportation system under one head was for the economic good of the community, and I still believe in that policy. Even the Massachusetts legislature confirmed all our purchases.

But at best I was simply the operating head of the road. The fight was between the banking interests; between New York on the one side and Boston on the other.

I had no more to do with the financial policy of the New Haven than I had to do with the editorial policy of the *Boston Post*. When the road needed money, it was supplied at times and in amounts by the banking house that dominated every move the New Haven made.

I will tell you of a little incident that happened a few years ago. I was traveling on the road one day when I happened to meet a representative of one of Boston's biggest banking houses. As a note issue was being contemplated by the New Haven, I talked with this man about the price of money and what rate of interest we should probably have to pay on the notes.

A day or two later I was hauled up on the carpet by representatives of our fiscal agency and told in effect to mind my own business. When the New Haven wants money, we will furnish it, they said, and we don't need advice.

Representatives of our fiscal agents made the necessary arrangements. My position was to be filled by Mr. Elliott. I knew this in February from friends in St. Paul. My own crowd was working behind my back.

While I was the operating head, the house of Morgan absolutely dominated the New Haven policies. J. P. Morgan is dead, but control is just as absolutely theirs today, and the second generation is working hand in glove with the Boston Machiavelli.

I came to New Haven not for the salary that was attached

to the job or any perquisites that might accrue to me as president of the road. I came because New England was my home and because I had seven children whom I wished to educate here in the East. Personally I have asked no one about my salary for over twenty-five years. I took what they gave me.

I believe that the paying of tremendous salaries to corporation officials is a waste of money. I believe that no man in the country is worth more than \$25,000 a year. And I know that I would work fully as hard for the New Haven Railroad for \$25,000 as I did for \$60,000 or \$75,000. This matter of large salaries will probably soon come before the Interstate Commerce Commission, and before many years the commission will be given the power to veto exorbitant salaries. Of course any man is human enough to take all the salary that is given him. But that does not alter the fact that he cannot earn for any corporation more than \$25,000 a year.

We bought the Boston & Maine purely as a feeder to the New Haven. The purchase has been approved by the Massachusetts legislature. Now that I am out of the game and have no axe to grind, I still maintain that the purchase of the Boston & Maine was made in good faith and was done for the economic good of New England.

No receivership, in my judgment, is necessary for the Boston & Maine.

In regard to the steamship end of the system, they are such an integral part of the service that it is impossible to say how profitable they would be if operated separately. If my advice had been followed we would have sold those steamship lines five years before the government ordered us to sell out.

When Morse offered the New Haven \$20,000,000 for the steamship lines, I advocated their sale. But the directors voted to hold them. Even at that time I pointed out that some day the government would compel us to sell them. Mr. Morse's offer of \$20,000,000 was for the stock of the New England Navigation Company, which cost us less than \$6,000,000. More than 50 per cent. of the business carried by the steamships is given directly by the railroads.

But aside from the mere question of policy I never cared to have the steamship lines on our hands. I was always terribly afraid that some day a fearful accident would take place on one of the Sound liners.

The New York, Westchester & Boston was purchased just prior to the panic of 1907. It has always been a source of keen regret to me that the company went into this enterprise, because there were so many ways in which the money could have been used in the development of the New Haven system to so much greater advantage. If I had had that money without the Westchester I could have four-tracked the road from Boston to Providence, could have taken out curvature and revised alignment, which would have saved us five miles between Providence and New London, and I could have electrified the entire New Haven road between New York and Boston.

The railroads will all go under government ownership. It is coming quickly. Five years ago I felt that I should not live to see it. But now I think that I shall. Regulation by the government during the last ten years has tended to lower the value of railroad stocks as investments. There is not the big money in railroads that there used to be. There will not be any opposition to government ownership when the time arrives, because private capital will find the field unprofitable as a result of the too strict regulation.

Under government ownership trains will still be late, wrecks will occur and mails will be missed and lost, in just as large proportion as they are today.

I am honestly of the opinion that there is no more safety in steel cars than in wooden ones. The only advantage in the steel car is that there is less danger from fire after an accident, and for that one reason it might be better to use steel cars.

*Extracts from an interview in the *Boston Post*, November 9. Copyright, 1913, by the Boston Post Publishing Company.

†Mr. Mellen's interview was followed in the next day's papers by brief interviews with some of the men who had been criticised. William A. Gaston, president of the National Shawmut Bank and identified with Morgan interests in Boston, took exception to the statement about Boston bankers. Charles A. Stone, of the Banking House of Stone & Webster, denied responsibility for any of the turmoil. George von L. Meyer, chairman of the stockholders' protective committee, denied Mr. Mellen's assertion that the committee was "a marionette" and that it was formed at the behest of the New Haven's fiscal agent. Mr. Elliott said that it was not until July that he was invited to take the New Haven presidency. A member of the firm of J. P. Morgan & Company, quoted in the *New York Times*, denied that there had been any strife between New York and Boston bankers.

MOVEMENT OF PRICES AND RAILWAY RATES.*

Upward Trend of Former Compels Increases in Latter All Over
World; France and United States Slow to Recognize Situation.

By M. CLEMENT COLSON,

Counsellor of State of France, formerly Director of Railways in the French
Ministry of Public Works, Professor of Political Economy in the
Ecole Nationale des Ponts et Chaussées of Paris, etc.

Among the economic phenomena which have characterized the last few years, few have been more marked than the general increase in prices. This increase at first influenced the railway situation only by the increase which it brought about in railway expenses. It is now commencing to bring about rate increases on a fairly large number of railway systems. In view of the rapid and continuous decline in transportation rates which has been one of the principal factors of economic progress for a century, this fact certainly merits attention.

When price variations are spoken of by the public at large, comment nearly always centers around changes brought about through retail sales. Economists who endeavor to measure these variations with exactness generally take for the purpose the average prices of the principal agricultural or industrial products as registered upon the exchanges where they are sold in bulk. These averages they call *index numbers*. In most cases they are interested only in transactions involving material goods, which constitute, however, perhaps only fifty per cent. of all current transactions. The prices taken into account by them do not as a matter of fact cover either wages or rents or transportation rates. To get an exact idea of what a given sum of money represents at different periods, it would be necessary to take account of both wholesale and retail prices of a number of products, such as services rendered by different categories of labor, by landlords who lease their property, by transportation agencies, etc. This would be a considerable task and one which, we believe, has never been attempted as a whole.

Yet studies made with respect to each price category taken by itself, according as they measure the general movement, permit at least an appreciation of its significance and importance. To be sure, this movement is not manifested to the same degree in different kinds of transactions, or in different countries whose markets are separated by more or less obstructive customs barriers. A generally characteristic gait is, however, maintained.

Disregarding oscillations resulting from alternating periods of prosperity and depression, there was till recently a general and rapid decline in the prices of industrial products, resulting from technical progress. Agricultural products, on the other hand, increased constantly in price in Western Europe until about 1875-1880, as a result of increasing density of population within a limited area. But about this time the tremendous decline in transportation rates that resulted from extensions of railways and steamship lines permitted older settled regions to draw a portion of their necessary subsistence from scarcely settled territory in the new world; the rapid fall in agricultural prices which took place toward the end of the nineteenth century resulted in an agricultural crisis. Both the increase of population in the new world and in the old, and the increase in consumption due to increased wages, have brought about a new movement of rising prices during the past fifteen years.

THE INCREASES IN WAGES.

Wages, on the other hand, have constantly increased. The increase, rather slow up to 1850, was extremely rapid both in agriculture and in industry between that date and the agricultural crisis. It slackened considerably in the country districts, and to a slight extent in the industrial centers, thirty years ago. During the past fifteen years, however, it has resumed an accelerated progress, first in the towns, then in the rural districts. One may

sum up the change in living conditions of laborers during two intervals, thirty years apart, by following a study of the French Statistical Office prepared with the care and acumen characteristic of all the labors of its director, M. Lucien March. The results of this study are shown by the following relative figures (calculated by assuming the corresponding figures of the year 1900 as equivalent to 100):

	1850.	1880.	1910.
Wages	51	82	110
Cost of living (uniform throughout)...	85.5	110	104
Purchasing power of wages	59.5	74.5	106

It should be remarked in passing that the advance in wages produced solely by the play of economic forces, notably technical progress and the accumulation of capital, was more rapid from 1850 to 1880 than from 1880 to 1910. Statistics confirm what a study of the mechanism of prices teaches, contrary to almost universal opinion, that the organized labor movement (infinitely more powerful in the second of the thirty-year periods considered above) is powerless to accelerate the advance in wages. We even believe that in France it had the reverse effect during the last few years, by disseminating ideas among the working classes that have considerably reduced the labor output. The result is that the net cost to the employer of a given piece of work has increased in recent years to a much greater extent than is indicated by statistics of increases in hourly or daily wages. This net cost would no doubt be less, the cost of living would also be less, the gain to the workman would be considerably increased, and his purchasing power would be very much greater, if the slackening of endeavor which has so much diminished the productivity of his work were less accentuated. As a matter of fact, in view of the attitude of labor, the peculiar mental influence of the labor unions is felt principally with regard to the productivity of labor, while wages depending on supply and demand escape their action whenever advances are sought which the state of the market at the moment does not justify.

In the cities rents also have notably increased. It is true that the cost of local transportation has considerably decreased at the same time that the cost of long distance travel has been decreasing, and also, except very recently, the cost of freight transportation.

The foregoing conclusions are based upon French statistics, but with very slight differences as to dates and as to the sweep of the movement, the general trend is the same for all Europe, and even today for America. It can be summed up by saying that the level of prices, including wages, presents a marked rise during the past century. Moreover this general movement, after having undergone a considerable slackening in the last quarter of the nineteenth century, and especially from 1882 to 1897, has been notably emphasized since then. Especially true of this latter period is the fact that the increase has become almost universal in character. Technical progress may continue to reduce the net cost of many industrial and agricultural products, but the margin is no longer large enough to neutralize either the increased cost and efficiency of manual labor or the increased demand due to the improved condition of the working classes.

We shall not inquire here into the causes of this general rise in prices. It may be remarked, however, that if the increase or decrease in the relative value of products or of different services results necessarily from causes which are peculiar to each, a movement which bears at the same time on practically all prices can hardly be explained except as the result of monetary causes.

*Translated from the *Revue Politique et Parlementaire*, of August 10, 1913, by Bureau of Railway Economics, Washington, D. C.

The more so that these causes at the present time are obvious. The increase in production of gold, added to the development of methods of payment without the use of money (notes, checks, book transfers, etc.), appears for a long time to have proceeded faster than that of the need for money. Although very much increased by the working of the Siberian deposits, the production of gold did not average 200 millions of francs (\$38,000,000) annually from 1840 to 1850. Carried by the exploitation of California and Australia to an annual average of 673 millions (\$127,870,000) between 1851 and 1870, the average fell back to 572 millions (\$108,680,000) between 1871 and 1890, but since that time the Transvaal mines have increased it to such an extent that it reached 1,089 millions (\$217,000,000) between 1891 and 1900, 1,959 millions (\$372,210,000) between 1901 and 1910, and finally amounted to 2,423 millions (\$460,370,000) for the year 1911. An equal increase in instruments of exchange must necessarily have resulted in a diminution of the purchasing power of money, that is, an increase of general prices.

If the production of gold continues to increase, there is no reason to doubt that our descendants will assist at a phenomenon analogous to that general increase during the sixteenth century which was the consequence of the enormous influx of precious metals resulting from the discovery of America, and which raised prices threefold according to some writers, and fivefold according to others. The existence at the present time of a larger stock of gold than four centuries ago, the colossal development of business transactions, the demonetization of silver and the diffusion of gold in the far East, serve actually to reduce the importance of the movement today, and without doubt will continue to do so in the near future. Its effects are none the less already felt and may be even more strongly felt in the future.

RAILWAY RATES LONG AN EXCEPTION TO THE RULE.

But there exists one industry, the railway industry, whose selling prices do not by the sole interplay of supply and demand follow the general rising movement under which it pays increased prices for all the things which it buys, notably the wages of its employees. Railway service is a public service which practically can be organized only by the state, or by grantees selected for the purpose. Railway operation has the character of a monopoly, and when a country endeavors to establish competition the only result is to divide the benefits of the monopoly between several enterprises. As a result, transportation rates cannot be left to free action; they must result from tariffs established by the government or under its control. Even in Anglo-Saxon countries the state, which has proceeded upon a wholly different conception, does not now allow the railways the same freedom of action accorded to them at the beginning, a freedom which has resulted in a control always arbitrary in character, although not as with us contractually defined.

Under these conditions an increase in rates, even when it is imposed by economic circumstances, always has the appearance of a unilateral and forcible act. This act is the more ill-received by public opinion the more it has become accustomed to seeing tariffs go almost constantly down in a movement which technical progress and the elasticity of traffic have rendered nearly universal. States have only rarely authorized increased tariffs on railways under their control, and when they have substituted government operation for operation under concession, they have generally sought to render the new régime popular by rate reductions. Both in England, where the railways desired to compensate themselves, by means of lessening former reductions which had become obsolete at certain points, for the new reductions imposed upon them at other points to diminish rate inequalities, and in the United States, where the cordial relations eventually established between different railway systems permitted the suppression of abnormal reductions brought about by previous competition over certain routes, laws have intervened to give quasi-judicial authorities power to oppose such increases. The freedom of action of the railway companies and the mobility of their tariffs, which has so powerfully contributed to the economic

development of the American continent by facilitating rapid railway growth, are no longer tolerated in the United States, since the need for new railways is less vividly felt than the need of equality in the treatment accorded competing producers. Increases in rates, always more rare than decreases, have for a long time been extremely exceptional almost everywhere, and have become rare even in America during later years.

But rapid increases in operating and construction expenses have come seriously to modify the situation in a number of countries. It was at the very crisis which followed the height of prosperity in 1906 and 1907 that the effect of this increase was most severely felt. As we have frequently stated in these pages, the movement of expenses always follows that of receipts, but at a slower gait; traffic progresses by spurts, the most recent of which have been somewhat in advance of the date set for them under the periodical alternation at approximately ten-year intervals of industrial prosperity and depression. At the beginning of these spurts the railroads meet the situation as best they can with the facilities at hand, and it is only when they have ascertained where, for what classes of traffic, and under what conditions the needs exist that they undertake the necessary and costly improvements of their operating facilities. Then, when the slackening of traffic renders it more difficult to provide for the new expenses, they endeavor to retrench. This is what occurred in all countries when the crisis of 1907-1908 seriously affected the financial status of most of the railway systems. But the results of the measures adopted to realize economies were nullified, when business again became active after a short period of slackening, by the general increase in prices. This increase is no doubt in part temporary with regard to coal and metals, but will probably be permanent with regard to wages; and the expenses brought about by the increase have been aggravated by the necessity of offsetting reduction in labor output by means of added facilities. It was under these conditions that the idea of raising rates gained ground and has been applied in a number of countries.

RECENT INCREASES IN RAILWAY RATES.

It has not been necessary to refer to Germany where, as we have frequently shown in these pages, abundance of traffic, added to exceptionally advantageous conditions resulting from the configuration of the country and from regulations very favorable to the railways, assured excellent results even with a relatively expensive system of operation. After the enormous falling off in net revenue in 1908, a serious effort was made to reduce expenses; since then the recovery of traffic has been sufficiently strong to secure for the capital invested a greater return in 1911 than the maximum realized in 1906, although capital had grown three and one-half billions (\$95,000,000) in the interval. Meanwhile, in the smaller German states, where the railways are less prosperous than in Prussia, the question of raising rates has been agitated at different times. Württemberg, soon after the unification of tariffs throughout the Empire in 1907, increased the price of fourth-class tickets in 1909 from 2.5 centimes to 2.875 centimes per kilometer (or from .765 cent to .88 cent per mile). The Prussian government withdrew the export tariffs on coal, but this was apparently less to augment receipts from coal traffic than to reserve that commodity for national industry. With regard to internal traffic the government contented itself with forcing the public to pay for the routing of freight shipments over longer but less congested lines. As to the stamp tax on bills of lading and passenger tickets which, established by the Empire, was levied for passengers at a progressively higher rate according to class of accommodation, this caused much disappointment since passengers simply shifted to the lower classes, and the measure has had the character of a general tax rather than an increase in rates, so that the railway administration of the several German states has suffered rather than profited by it.

In England successive interventions by the government at the time of the threatened strikes of 1907, and afterwards at the time of the strike of 1911, caused the companies to make con-

cessions to their employees in consideration of the promise that legal facilities would be afforded them for two classes of relief measures: first, the consummation of agreements or consolidations that would permit reductions in expenses by suppressing existing competition on many lines, not as to prices (in this respect there has been an understanding for a long time among the railways), but as to the facilities offered to the public. Second, increases in freight rates. A bill presented in 1912 which covered these two points, and at the same time imposed various new obligations upon the railway companies, did not pass. The government, called upon to fulfill its part of the agreement, at last carried a bill through both Chambers which consisted merely of a brief amendment to the Act of 1894, by virtue of which the Railway and Canal Commission was empowered to oppose all unjustifiable increases of freight rates. This amendment, which took effect in March, 1913, declared that an increase would be deemed justifiable when it should be established that its object was to meet the additional expense of handling goods resulting from increases in wages and improvements in working conditions since August 19, 1911 (date of the strike).

Already, in January, 1912, the railways had put into effect certain increases in passenger rates, to which the restrictive measures of 1894 did not apply; these very moderate increases affected only certain exceptional passenger tariffs. Utilizing the new privilege granted them in regard to freight rates, they put into effect on July 1, 1913, increases equivalent to a general surcharge of four per cent. on all traffic. It is natural that the customers of an industry thus suffer the consequences of its increased net cost; this is only what occurs in all unregulated industries, whether the increase results from the intervention of public authority, so frequent nowadays in the matter of labor, or whether it proceeds from natural price variations. So far as the railways are concerned the British government has kept its promise by refraining from interposing legal obstacles which would have rendered them victims of the pressure brought upon them on behalf of their employees. As to the agreements between different railways for the purpose of reducing expenses, the indefiniteness of the law has allowed them in most cases to consummate these agreements without the necessity of new legislation.

In Italy, as in England, betterments of the conditions of the laboring force have necessitated increases in rates. The old leasing system, which was ended in 1905, did not sufficiently permit the railways to provide the means for necessary increases in equipment and thus made it impossible for them to respond to traffic needs. Direct operation by the government, under the capable and energetic management of M. Bianchi, and a fairly independent administration, has notably improved the service. But expenses have gone up considerably, for the most part as the result of legislation enacted by Parliament, under pressure from railway employees, providing for increased rates of pay. The latest of such laws, enacted April 13, 1911, provided that part of the new charges should be taken care of by means of an increase in the price of term tickets and of special tickets issued at unusually low rates. These increases have produced six millions (\$1,140,000), perhaps a little over three per cent. of total passenger receipts. At the same time there has been authorized an increase in accessory charges on freight amounting in the aggregate to three millions (\$70,000), perhaps a little over one per cent. of the receipts from ordinary freight. This increase has for its object the creation of a reserve of 4,000 cars for the transportation of agricultural products.

In Switzerland a law passed June 23, 1910, improved the conditions of railway labor to a very marked degree; its application will add about fourteen millions (\$1,660,000) to a wage aggregate amounting to sixty millions (\$11,400,000) in 1910. Inasmuch as the wage increases provided for are often automatic, it is fair to ask whether the service will be improved along with the condition of the employees. On the other hand, the government railway administration has put into effect increases running from nine to twelve and a half per cent. on certain forms of sea-

son tickets very much used in that country. Other increases have been proposed, applying to round-trip tickets, but these the Federal government has not ventured to adopt.

In Belgium the state has for several years been endeavoring to offset the increase in expenses, brought about through increases in railway wages, by increases in rates. The stamp tax, which in France is but ten centimes (1.9 cents), has been raised from twenty to fifty centimes (3.8 cents to 9.5 cents). Measures have been taken to prevent such combining of shipments as permit the economical transportation of small consignments. Finally, after a long series of struggles and one first ineffectual attempt, increases of fifty centimes (9.5 cents) per ton have been imposed upon short-haul shipments of all coals.

In Denmark the net revenue of the state system declined from 6,300 francs per kilometer in 1905-1906 (\$1,927 per mile) to less than 2,100 francs (\$399) in 1909-1910, the gross revenue being more than 31,000 francs (\$5,890) per kilometer. The public authorities took steps toward putting into effect, on the first of December, 1911, new tariffs which would increase total revenues about 9 per cent.

In Russia ordinary freight rates on a large number of manufactured products were considerably raised in 1910. Some increases were also made with respect to passenger rates. But on account of the poverty of the population, these latter increases brought about a reduction of passenger traffic and a shifting from higher to lower classes which has forced a partial abandonment of the scheme.

It is especially in Austria and in Hungary that a considerable sustained effort has been made. In Austria the state system, considerably enlarged by the policy of purchase of railway lines which has led to the gradual disappearance of all the private systems, with the sole exception of the Südbahn, has been far from earning the interest on its capital. For a long time the government has been seeking to increase revenues by means of rate increases. Some years ago station charges had been considerably increased. A general reform was instituted in 1910, applying both to freight and passenger tariffs, by means of which revenues were increased ten millions (\$1,500,000 the first year and thirty-seven millions (\$7,030,000) in later years. But the results were seriously disappointing, and in 1911 and 1912 new and important increases were effected bearing partly upon certain special classes of goods (cement, lumber, alcohol, petroleum, coal, sugar) and partly on merchandise of all classes in carload lots.

In Hungary still more radical measures were adopted. In 1909 the net revenue of the state system was forty-five millions (\$8,350,000) less than the capital charges. During 1910 and 1911 rates on a majority of commodities were sensibly increased. The results, though satisfactory, remained still insufficient, and on March 1, 1912, normal fast freight rates were uniformly raised 7 per cent., exceptional fast freight rates 5 per cent., and all ordinary freight rates also 5 per cent. Finally, the celebrated zone tariffs for passengers, which had formerly been extolled as a great step forward, were completely abandoned.

This zone system, established in 1889, was destined in part to develop local passenger traffic and in part to bring the capital of Budapest and the farthest parts of the Kingdom into closer relations. At the beginning there were two zones for local passenger traffic, and twelve zones for journeys of from 25 to 225 kilometers (15.5 miles to 139.5 miles, each carrying a uniform rate for all the points within a fairly wide area, the rates increasing at successive steps either of 15 or 25 kilometers, 9.3 miles or 15.5 miles). Finally, there was a single zone, with a uniform fare, for all journeys over 225 kilometers (139 miles), even up to 800 kilometers (496 miles). However, there was a necessary break in all journeys by way of Budapest. This tariff produced a species of traffic, not then existent, over very short and very long distances. From 1888 to 1894 the state railways and the Austro-

Hungarian company's lines purchased by the state in 1891 increased their traffic in the following proportions:

	Per cent. of increase in	
	Number of passengers.	Passenger receipts.
Local zones	650	232
Zones 2 to 12.....	40	10
Zones 13 to 15.....	246	186

But when the long-distance travel, hardly existent before, had developed so seriously as this, it did not take long to ascertain that the receipts from such travel did not cover the corresponding expenses. In 1896 and 1903 the local tariff was altered and two new zones created, one of 75 (46.5 miles) and one of 100 kilometers (62 miles), so as to establish a complete uniformity of rates only beyond 400 kilometers (248 miles). Experience shows that these increases have had no effect on the growth of traffic.

Under these conditions passenger traffic barely made expenses, but did not contribute, so to speak, to net revenue. On the first of July, 1912, the zone system of tariffs was abolished. Rates are now (with a few exceptions) increased at five-kilometer intervals for trips under 30 kilometers, and at ten-kilometer intervals thereafter, the per-kilometer rate rapidly decreasing above 250 kilometers. The increased revenues resulting from this new classification amount to about sixteen million francs (\$3,050,000), or about 18 per cent. of former passenger receipts.

THE SITUATION IN FRANCE.

It is clear that the once generally accepted idea, that railway rates must always continue to decline, is contrary to the facts. In France public opinion still refuses to admit that rates can ever be increased. However, the operating results which we analyze each year lead us to fear that, as in so many other countries, we shall be obliged to apply higher rates some day. From 1906 to 1912 the revenues of the railways *d'intérêt général* increased in round numbers about 350 millions (\$66,500,000), while operating expenses increased 400 millions (\$76,000,000), and the capital invested had increased about two billions (\$380,000,000). Of this increase in expenses, the follies that have accompanied the purchase by the state of the Western Railway are perhaps responsible for fifty millions (\$9,500,000), adding that much to the normal increase in expenses which the government-operated systems must suffer, as well as the private systems. Even after deducting these fifty millions (\$9,500,000), it is clear that the increase in expenses entirely absorbed the total increase of revenue. The operating ratio in 1906 was about 52 per cent. The length of the new and slightly productive lines put into operation in the interval, upon which this ratio is necessarily higher than on the older lines of dense traffic, is hardly more than 1,000 kilometers (620 miles). On the other hand, the additional traffic of the older lines would not by a wide margin have brought an increase in expenses proportionate to that of revenues, had not the net cost of transportation grown. On the whole, an increase in expenses equivalent to half the increase in revenues would have been the expected thing had not the conditions of operation been seriously changed.

Among the changes of this period are those which represent real improvements, both as to the speed and the number of trains, improved car accommodations, etc. But the expenditures undertaken by the railway managements on this score have not greatly exceeded the economies brought about through technical progress; the use of more powerful locomotives, permitting an increase in average train load, the development of classifications based upon weight, etc. The enormous gap between the results actually attained and those reasonably expected from the development of traffic is due chiefly to the general increase of prices and especially of wages.

But the intervention of public authority has considerably contributed to the increase. We have often spoken of the

special legislation which assures railway employees better pensions even than those granted to state employees themselves, and incomparably better than those provided under ordinary legislation for workmen in general, without even that contribution from the budget which is granted to other workers. This special act increased expenses of operation from twenty-five (\$4,750,000) to thirty millions (\$5,700,000) a year, which would have been infinitely better employed in the amelioration of wages, to say nothing of eight millions (\$1,520,000) carried in 1912 to capital account on behalf of employees pensioned during that year, nor of its retroactive provisions, nor of the slowly decreasing amounts it will add to the expenses of future years. The labor regulations imposed upon the railways have also added new expenditures over and above those brought about by such increases in force as have been necessitated by the general movement tending toward greater leisure for laborers.

The law of 1905 regarding the liability of carriers has further added to railway expenses, by means of payments for damage, to the extent of fifteen millions (\$2,850,000) a year.

When the law of 1905 had overthrown one of the conditions made by the railway systems in return for the voluntary rate reductions introduced by them, the government recognized that it could not insist upon these reductions without some compensatory arrangement. The Minister of Public Works took the almost unheard of step of promulgating increases in certain rates that were extremely low and were due for revision when the effects of the new legislation should become known. But when the time came the administration directed its whole weight of authority against the railways, to obtain their renunciation of certain surcharges which it was impracticable to refuse to them if they should insist on their rights. The railways gave in upon the promise that a slight compensation would be granted them through the revision of certain tariff regulations much more burdensome to them than really beneficial to the public. Then, as always, when it was proposed to promulgate certain rules facilitating railway service, the administration backed down in the face of demands formulated not so much by large shippers, seriously interested in the question, as by small groups who receive their instructions from agencies on the lookout for opportunities to file claims. As a final result, the railways obtained nothing in exchange for their consent to the maintenance of special tariffs, even in cases where the evidence itself showed that the provisions reducing the liability of carriers had been among the determining conditions underlying the reductions voluntarily agreed to by them.

Although the new operating expenses absorbed, and more than absorbed, the increases in revenues, the amount of capital grew and the corresponding charges grew still faster. The general increase in the rate of interest has continued simultaneously with the increase in prices for 15 years past. Of late it is especially with regard to old family investments that this increase has been manifested; the cost of living has forced a search for more productive investments; furthermore, in the face of financial and other threats that are directed from all sides upon accumulated wealth, the difference in safety between securities once regarded as absolutely sound and other investments no longer seem important. Fifteen years ago the rate of interest (including funding costs) at which the railways borrowed hardly exceeded 3.25 per cent.; today they can no longer issue securities without paying about 4 per cent. Retirement of securities becomes more difficult in the measure by which the end of the period of concession approaches; the annual amortization charge (*l'annuité des emprunts*) has increased by 0.50 to 0.75 per cent. in 15 years, and amounts to 75-115 centimes today, according to the length of time yet remaining to the concession of each system, and the charge will grow very rapidly unless measures are taken to render possible the continuation of betterments indispensable to the good of the service.

Whether the increase in capital charges and expenses of

operation bears directly upon the state in regard to its own system and the expenditures assumed by it, through the construction of new concessionary lines, and whether it directly affects the railways with which the state is closely associated through guarantees of interest and the division of profits, it reacts no less gravely upon the state budget. For other reasons as well the budget is affected by the general increase in prices and wages, being drawn upon especially for the improvement of the working conditions of all public employees—not to give satisfaction to labor associations or unions whom it would be easy to bring to their senses, but because the recruiting of civil or military employees becomes more and more difficult, and will become impossible if they are not properly compensated. The new military burdens which have been imposed upon us and the social burdens sometimes imprudently assumed, added to those which have resulted from the natural movement of prices, forced the state to secure new resources for immense sums never required before, not even after the catastrophe of 1871. At the very moment when it becomes necessary to search on all sides for new taxes, it is no longer possible to discard *a priori* any idea of an increase in transportation rates.

EFFECT OF INCREASES IN RATES.

Without doubt this increase will bear grievously upon agriculture, commerce and industry. But under whatever form it may arrive, the new burdens imposed upon national production will fetter that production. To burden the transportation industry, or to tax its transactions, or to attenuate its capital, all tend to diminish the productive power of a country; the problem is to so distribute the load as to render no one part of it crushing. A certain increase in railway rates must nevertheless follow upon a general increase in prices, such as was described at the beginning of this article. Soon, perhaps, the state will no longer be able in fairness either to refuse the increase to the railways, in whose prosperity it is directly interested as a partner, or to continue to operate its own system at a continuously increasing loss. Perhaps also it would be wise to use from now on additional transportation charges that are relatively low and well selected as

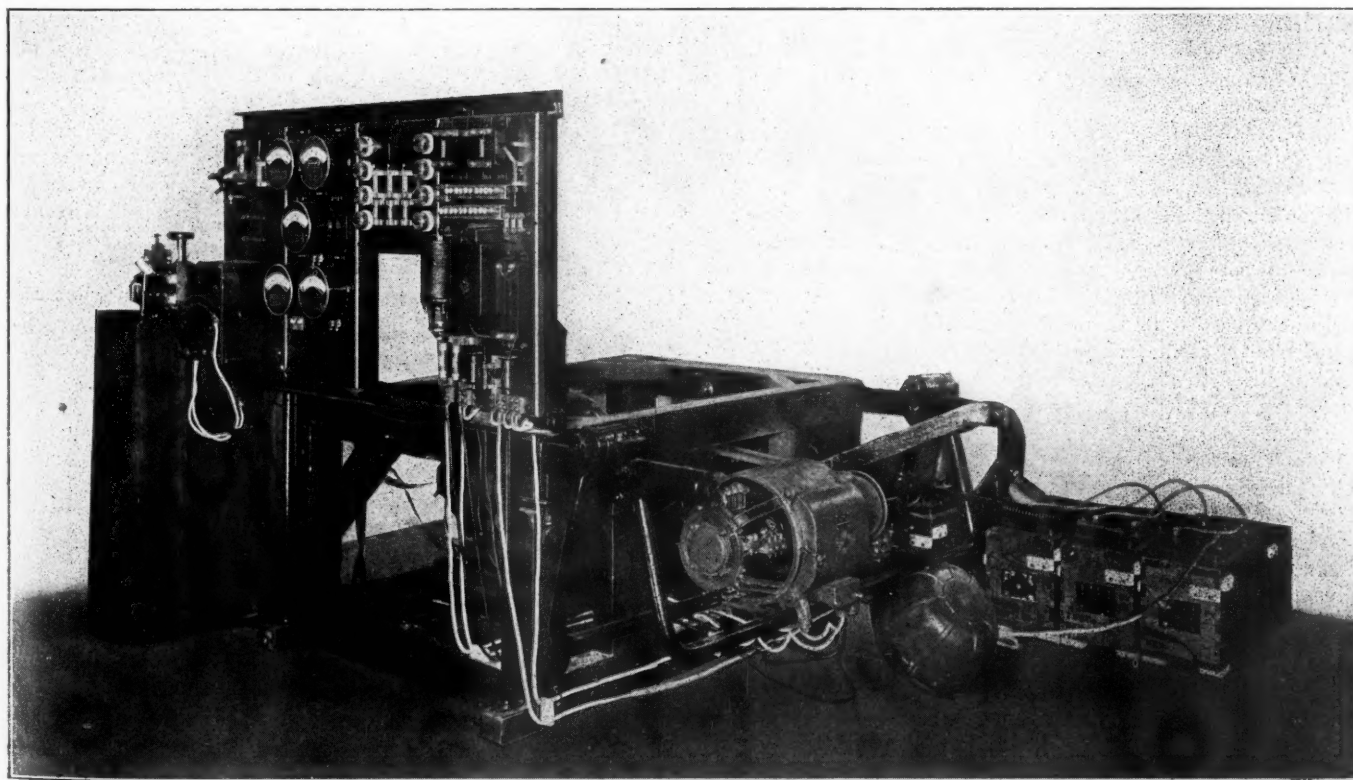
part of the resources of which there is need, in order to cover at least the interest on the capital expended to develop all sorts of means of communication.

The memory of the enormous part that has been played by the considerable decrease in transportation rates in modern progress must not lead us to exaggerate the inconvenience of a slight increase. The experience of actual increases abroad, as well as increases of transportation taxes in France some time ago, show that charges of this kind are not especially prohibitive provided they be moderate and well selected; and even if they were to bear heavily upon passengers traveling on passes or special tickets (*cartes de circulation*), yet they constitute a valuable means of moral uplift.

What is of significance to the public welfare is not that a special form of service like the railway service is left out of the general movement of increased prices and augmented public charges, but that these charges be not increased without absolute necessity. The policy of reducing transportation rates is an excellent one, but to carry it out it is necessary to avoid increasing beyond measure the charge upon the carriers, the expenses of operations of doubtful utility or of no utility at all, and even, if possible, the total budget. On the other hand, when it becomes absolutely necessary to increase the levy made by the public power upon national production, the users of means of communication of all kinds should justly and inevitably contribute their share, at least in the proportion by which special legislation and the general increase in prices have increased the net cost of the services rendered to them.

CONSTANT VOLTAGE AXLE LIGHTING SYSTEM.

At the recent convention of the Association of Railway Electrical Engineers the Electric Storage Battery Company, Philadelphia, Pa., exhibited its new constant voltage axle lighting system which was described by J. Lester Woodbridge, chief engineer of the company, at an informal dinner



Constant Voltage Axle Lighting Equipment Arranged for Demonstration Purposes.

given to the members of the association. A description of this system was published in the *Railway Age Gazette*, May 9, 1913, page 1037. Mr. Woodbridge said in part:

The conditions under which the storage battery was called upon to operate in train lighting service and especially in axle lighting service were so unsatisfactory from the battery standpoint that they threatened to give the storage battery a most unsavory reputation, which it in no way deserved. The original axle lighting systems started with the dynamo and regulating apparatus and were designed and developed by dynamo and apparatus designers who were but little familiar with the storage battery requirements. The storage battery was included reluctantly as a necessary evil and incidentally was utilized as a reservoir to receive all excess current that was not required by the lamps, and also to furnish a means for controlling the voltage of the dynamo.

We have taken the battery as a starting point and have designed the balance of the equipment with reference to the battery characteristics and requirements. The Electric Storage Battery Company's axle lighting system is designed to retain all of the advantages of the straight storage system, while eliminating the disadvantages. In this system two new principles have been introduced: The dynamo controls the voltage on the circuit and therefore controls the voltage maintained at the battery terminals, instead of the battery controlling the voltage of the dynamo. The dynamo is designed for constant voltage rather than constant current, this constant voltage being adjusted slightly above the normal floating point of the battery at a value just sufficient to keep the battery always practically full.

It has frequently been asserted that it is impossible to fully charge the battery, or to keep it fully charged at the voltage which we have adopted; that is, approximately 2.25 volts per cell. During this entire year the test battery that has been in active railway service has not been subjected to any gassing charge, nor any charge in fact, except that which it normally receives en route from the dynamo and that without any change in the adjustment of the dynamo voltage.

We have demonstrated the fact that in our axle lighting service the difference in voltage between charge and discharge can, in actual practice, be so far reduced as to eliminate the necessity for any lamp regulator, and this without impairing the satisfactory character of the illumination and without excessive cost of lamp renewals. For an equipment of 16 cells of lead battery we find that a voltage between 35 and 36 volts maintained across the battery terminals when the dynamo is in operation is sufficient to keep the battery full and to recharge rapidly after any extensive discharge. So long as the changes in voltage are gradual a very considerable range in the intensity of illumination may be permitted without producing unsatisfactory results. In fact, the variation in illumination resulting from a gradual change from 35 volts down to 32 volts is far less than the difference in illumination at different points in the car, or the changes which take place in ordinary daylight illumination.

In addition to the controlling resistances we have an automatic switch which involves some special features. In addition to the usual shunt and series coils, a third coil is added, which is connected between the dynamo and the battery. The main shunt coil is insufficient to close the switch, or keep it closed without the assistance of this auxiliary coil, or of the series coil. The auxiliary coil, therefore, determines the closing of the switch by the difference between the dynamo and battery voltage, whereas the switch will open as soon as the current in the series coil drops to zero. On account of the latter characteristic the switch is never obliged to break an appreciable amount of current, and therefore no flickering of the lamps occurs.

The equipment that has been in service on one of the principal Western trunk lines during the past year has run 159,368 miles with no light failures, no delay to car service on account of the axle lighting equipment, and no repairs to the dynamo excepting the replacement of a defective ball bearing.

The ball bearings on the standard equipment have since been made larger. There has been no charging of the battery other than that given by the axle dynamo en route and no change in the adjustment of the controlling apparatus. For the purpose of test the battery was completely discharged before leaving Chicago for Newton, Kan., January 9, and returned January 12, practically full, no change having been made in the adjustment of the controlling apparatus. It was indicated from this service that filling the batteries with water twice a year is sufficient.

REFUNDING OVERCHARGES IN OKLAHOMA.

The corporation commission of Oklahoma has won its suit against the railroads to reduce freight rates, and it has in its possession the money to make refunds to shippers on account of freight transported during the pendency of the suit; but claimants are likely to have to wait a year or two for their money, because the commission has not enough clerks to attend to the accounts. The legislature adjourned without making appropriation for clerk hire.

The chairman of the commission says that "probably no material progress can be made by the commission in turning the money back to the people until the next legislature meets. The refund amounts to approximately \$400,000 (on the commodity freight rates) to be returned to the shippers.

"Before the commission won this case, the railroads filed reports showing all the shipments covered by the commodity rates, and the amount of excess charges on each shipment is checked from these reports; then the railroad representatives verify the amount due. Voucher is then received from each railroad. The amount of refund due and received on the first commodity checked, by the commission (coal) was as follows:

"Atchison, Topeka & Santa Fe, \$24,931; Gulf, Colorado & Santa Fe, \$7,656.77; Missouri, Kansas & Texas, \$8,869.16; Oklahoma Central, \$5,031.66; Chicago, Rock Island & Pacific, \$74,851.68; Kansas City Southern, \$2,595.46; Fort Smith & Western, \$2,883.18.

"The excess charges for the first three lines have been paid into the hands of the commission and checks sent to shippers, except where there is a controversy as to the proper person to whom the excess charges should be paid. The Rock Island line has recently paid \$74,851.68, which will be disbursed as soon as the office force can do the work incident thereto.

"The amount of excess charges on lumber, oil and building material is now being checked. Grain and grain products will be the last commodity taken up. Since we have only our regular force to do the work they can work on it only after the regular work of the commission is performed. There are approximately 200,000 shipments which will be checked.

"The Oklahoma Supreme Court has recently affirmed the case against the Pioneer Telephone Company, wherein there is \$62,057.27 to be refunded to the telephone subscribers of Oklahoma City.

"On October 7 the Supreme Court approved the express rates prescribed by the commission, wherein there will be slightly more than \$600,000 to be refunded to the express shippers of Oklahoma. There are approximately 6,000,000 express shipments to be checked.

"The telephone and express companies are now contesting the right of the commission to collect these refunds for the public, insisting that each shipper or telephone subscriber should present his claim. If their position is sustained there would not be \$50,000 in claims presented, whereas the commission would locate and send to the parties the refunds due."

STATE RAILWAY MILEAGE IN NEW ZEALAND.—There were in New Zealand on March 31, 1912, 2,808 miles of railway owned and operated by the state, and 29 miles owned and operated by private companies.

COMMISSIONERS' REPORT ON SAFETY.

The Committee on Rails and Equipment of the National Association of Railway Commissioners, whose report, presented to the Washington convention, was noticed last week, page 871, consisted of James E. Sague (chairman), E. E. Clark, W. J. Wood, G. W. Bishop, Frank Avent, J. A. Knott and W. H. Mann. Following are extracts from those parts of the report dealing with steel rails, speed recorders and the space interval.

Owing to a variety of conditions the rail failure question is of much less public interest now than it was last year. This fact, however, is no indication that the subject is less important. The main reason for its diminished prominence is the decreased breakage of rails due to the more favorable weather conditions this year than last. These favorable conditions are indicated by the fact that the rail breakage in the state of New York for 12 months this year was 3,297 as compared with 5,900 for the preceding year. The figure for this year is about the average of several years preceding the year of greatest breakage, 1912, and it is thus indicated that in the improvement of the past year better weather conditions form the main factor.

We think there is much to indicate that the density of traffic, speed, and wheel loads are of large importance in causing rail failures, and we doubt if the effect of these factors can be entirely overcome by increasing the weight of the rail. It must be borne in mind that the area of contact between the wheel and rail cannot be materially increased by the use of heavier rails and we believe that it is impossible to say from present knowledge how much of a factor increased intensity of pressure, due to heavy wheel loads, may be in causing increased rail failures. It is probable that many rails break under severe service, showing by their fracture faulty material which would never have broken under lighter service. There will always be many cases in which it is difficult to distinguish between unfair conditions of service and defective material in determining the cause of breakage.

Much criticism has been directed against the steel manufacturers for sacrificing quality to large production, but on the other hand it must be acknowledged that the wheel weights now being used upon both cars and locomotives in the United States are so great as to be entirely without precedent in railroad history, and the combination of high speed and heavy wheel weights, together with the extremely severe track conditions frequently met in winter operations in this country, produce conditions which are most difficult to meet.

Considerable inquiry has been made with a view of obtaining further information on the subject of internal transverse fissures such as caused the Manchester accident on the Lehigh Valley Railroad. No important additional information has, however, been secured, and the fundamental cause of the Manchester wreck remains in doubt. This type of failure remains one which demands most careful consideration, especially in view of the fact that it appears to have developed more in open hearth steel than in Bessemer, and there is consequently danger that such failures will increase with the use of open hearth steel.

The report of the Bureau of Standards submitted to the Interstate Commerce Commission in the Louisville & Nashville case places much stress upon the conditions of service as tending to develop transverse fissures in the rail. It is difficult, however, to see why these fissures do not develop more generally if the conditions of service are a main cause of this type of failure. In the Louisville & Nashville case 11 transverse fissures were found in the broken rail, and it is difficult to believe that such a complete breaking up of the structure of a rail could occur unless some important defect in the quality of the rail itself was a contributing cause. We are inclined to think that the best public information on this subject is that contained in report No. 31 of the American Railway Engineering Association regarding the development of transverse fissures in 19 rails on the Pennsylvania system. The report refers to inclusion of slag as a principal cause of this defect. [The report here repeats certain conclusions of the previous year, as follows:]

Defective track conditions cause many rail failures, especially in the winter. The principal contributing defects appear to be bad surface and poor drainage.

Defective equipment causes many rail failures, especially in connection with heavy wheel weights and high speeds. The most serious cause of failures under this head is "flat wheels." Rail failures due to defective equipment are much greater in winter than in summer, and, in connection with defective track and high speeds, probably constitute the principal causes of increased breakage of rails in winter.

The speed question has received wide attention during the past year, and there appears to be some danger of exaggerating its importance as compared with other elements which lead to accident. There is, however, no question but that the education that the public and some of the railroad men have received regarding the effect of high speeds has been of great value in correcting the evil of excessive speeds, and has thus not only diminished the chances of accident, but has conduced to economy of operation.

The most notable change has been the agreement of the New York Central and the Pennsylvania to increase the running time of the fastest New York and Chicago trains from 18 to 20 hours, in accordance with the suggestion of one of the State Commissioners. This increase was for winter operation only, but the conclusion was reached by the companies to continue the 20-hour schedule through the past summer, and this decision we believe to have been wise. There is no question but that high speed schedules in winter are more dangerous than in summer, and the lengthening of winter schedules is therefore indicated as proper. There are, however, certain summer conditions which contain elements of danger which do not prevail to the same extent in winter, such as the large amount of new construction usually carried on, the renewals of ties, rails and ballast which must be conducted between trains, and the delays to traffic which result from heavy summer passenger travel, especially at the beginning and end of the season, and which increase the tendency to fast running in order to make up time with delayed trains.

Discussions with prominent officers of the railroads above referred to indicate that the lengthening of time of the fast New York-Chicago trains has resulted in nothing but benefit, and it is possibly fair to say that the 10 per cent. reduction of speed has increased the factor of safety 50 per cent. . . .

Some criticism has been made regarding the efforts of state commissions in urging the railroads to improve their records of percentages of trains on time. . . . The commissions' efforts should be devoted principally to the records of trains which appear to be systematically late, and which are run behind time month after month. Many such cases are found.

Many broken rail accidents have no doubt been prevented by the electric track circuit, and we believe that such a circuit in connection with an adequate signal system is essential to the safety of high speed operation in winter.

The final conclusions of the committee of last year are repeated [*Railway Age Gazette*, November 29, page 1038].

SPEED RECORDERS.

One of the most important subjects to be considered in connection with equipment at this time would appear to be that of speed recorders.

An important use of speed recorders is being made by the Delaware & Hudson Company on 20 Mallet locomotives. These locomotives are among the heaviest in the world, and are designed especially for slow pushing service on mountain grades. It was thought necessary for good operation and economical maintenance to restrict the speed of these locomotives to 15 miles an hour, and to secure positive evidence that such instructions are being carried out the "Flaman Speed Indicator" has been applied. This is a German invention which makes a chart of the entire trip and gives a diagram of the speed, the location on the line, and a record of any abuse to which the engine may have been subjected on account of the drivers slipping. We are advised that the first year's successful operation of these engines

is due principally to the indisputable evidence gathered from the speed recorders and to the resulting discipline which can be fairly administered where violation of the instructions is shown. It is stated that it is rarely necessary to call the enginemen's attention to irregularities shown by this device as they fully recognize that it tells the story accurately and that discipline will be administered in accordance therewith. Cost of maintenance of this apparatus is thought to be about \$50 a year, although the trial has not been extensive enough to settle this point accurately.

We feel that much caution should be exercised in recommending the use of any additional complicated apparatus in connection with train operation. The difficulty of maintaining the present apparatus and of instructing engineers, trainmen and shop men to understand and use it properly is enormous, and imposes one of the great burdens under which operating men have to work. We, however, believe that the advantages to be secured both in economy and safety from a reliable speed recorder are sufficient to justify extensive and thorough trial, and we think that the use of such apparatus will eventually become as general in this country as it is in Europe.

The most important class of accidents . . . has been rear collisions. Much attention has been given by some of the commissions to the prevention of this class of accidents. It appears to be clear that the most important elements in this connection are the signaling system, the appreciation and devotion to duty of engine and train men, and the selection, instruction and discipline of these men. We think it will be admitted that most of the recent accident records indicate the possibility of improvement in one or more of these directions.

[The report here recounts the history of the P C equipment of the Westinghouse Air Brake Company, with which the engineman can always obtain full emergency braking power, even immediately following a service application.]

THE SPACE INTERVAL.

In some cases effort has been made to improve conditions by the use of the overlapping system of signals. The most notable instance in regular railroad service is the practice of the Fort Wayne Line of the Pennsylvania System. The signals on this railroad are so arranged that each train is protected by two stop signals and one caution signal. An additional block is therefore provided as a space interval above that used in the ordinary automatic signaling system. An investigation of the signal system of the Fort Wayne Line has just been made by an engineer for the Second District Public Service Commission of New York, and he advises that it is operating satisfactorily and is considered by the officers of the Fort Wayne to be of decided value in promoting safety, and to have had a material effect in reducing the number of rear-end collisions. It is understood that this "overlapping" system of signals reduces the capacity of the line through the fact that trains are automatically spaced farther apart than in ordinary signaling, but it is thought that the increase in safety more than compensates for this reduction of capacity. Prominent officers of the line state that the increased protection of trains afforded by this signal system has an important effect in reducing the strain under which the operating officers have been working, and that a return to the ordinary system would not be considered.

It, however, appears to be the fact that the majority of operating men and signal engineers through the country prefer what may be called the standard signaling system, and believe that the "overlapping" system such as used on the Fort Wayne does not materially increase safety, and in fact has a tendency to encourage lack of attention to signals by engineers.

The above discussion is given not with the purpose of indicating any opinion on the part of members of the committee, but to show the complex considerations which enter into this problem. It is therefore submitted that much study and investigation must be made before important action on this subject through legislation or by commission orders can be safely decided.

General News.

The freight house of the Grand Trunk at St. Catharines, Ont., was destroyed by fire last week; estimated loss, \$50,000.

The Texas & Pacific and its telegraph operators have reached an agreement on a new wage schedule, which affects some 450 men.

A bill has been introduced in Congress, and has already been passed by the Senate, making interstate pipe lines conveying gas subject to the act to regulate commerce.

The Canadian Northern announces that within about ten days freight trains will be run through between Montreal and Toronto. Passenger trains will not be run on the new line until the spring.

Tunnel No. 7, on the Southern Pacific, between Santa Margarita and San Luis Obispo, Cal., which has been closed since September 24, by a fire which required sealing both ends, was restored to service last week.

Hearings in the wage controversy between the Chicago, Burlington & Quincy and its conductors and trainmen were begun before the federal board of arbitration, of which H. S. Boutell is chairman, on November 6 at Chicago.

The arbitrators who had adjudicated the wages of firemen on the eastern roads a few months ago are sitting in New York this week to consider differences which have arisen concerning the construction of some of the provisions of the award.

Track repair employees numbering, it is said, 5,000 have asked the Canadian Pacific for an increase in pay and application has been made to the Canadian government for the establishment of a Board of Conciliation to investigate the differences between the company and the employees.

On the Lehigh Valley an order has been issued to have all water barrels and fire pails, in which water is kept standing, treated with a small quantity of calcium chloride to prevent the water from freezing. At the same time this calcium chloride will tend to prevent evaporation.

The Post Office Department estimates that the gross receipts from the parcel post business during the present calendar year will amount to \$80,000,000, of which \$30,000,000 will be profit. This is double the amount of profit expected when the parcel post was established at the beginning of 1913.

In the Federal Court at Birmingham, Ala., November 6, John L. Parker was sentenced to six years' imprisonment for stealing shoes out of a freight car in the yard at Birmingham, May 4; this under the recent act of Congress, giving the Federal Courts jurisdiction over robberies from cars in interstate commerce.

Firemen, enginemen, conductors and trainmen on the Southern Pacific lines in Texas are taking a strike vote because of the refusal of the company to negotiate regarding certain demands of the men with a joint committee representing the four brotherhoods. The company insisted on dealing with the four organizations separately.

The upper house of Congress has adopted a resolution introduced by Senator Luke Lea, directing the Interstate Commerce Commission to inquire into the relations of the Louisville & Nashville with the Nashville, Chattanooga & St. Louis, to determine whether they would be competitors if separately owned. The resolution also directs an inquiry into the relations of these roads with the Tennessee Midland, the Tennessee, Paducah & Alabama, and the Western & Atlantic. It is proposed to determine whether these roads conspire to fix prices, what free passes are issued and to whom, and what relations the railroads have to state politics.

Collision on Our Government Railroad.

A press despatch from Panama, November 7, reports a collision on the Panama Railroad at Paraiso between a regular passenger train and a train consisting of a locomotive and one platform car, carrying workmen. The conductor, the engineman and four negro laborers were killed and eight other persons were injured.

Unfilled Tonnage of the Steel Corporation.

The report of the United States Steel Corporation shows that on October 31 the unfilled tonnage was 4,513,767 tons, a decrease of 490,018 tons from the previous month. This was a surprise, as a decrease of not more than 300,000 tons had been anticipated. The unfilled tonnage on the books of the company on October 31, 1913, was smaller than at any time since November 30, 1911, when it was 4,141,955 tons.

Soft Radiance Not Satisfactory.

The indirect lighting system of the Merchants' Limited, one of the New Haven road's five-hour trains between Boston and New York, is to be supplemented by the installation of tungsten lights along the beam on the lower deck of each car; this to increase the light for reading purposes, concerning which there has been some complaint. When first installed the inverted globes suspended from the ceiling of the cars each contained one 100-Watt tungsten lamp. By displacing these with three 50-Watt lamps an increase of 50 per cent. in the amount of light was obtained, but even with this change we are informed, some of the regular users of the trains complained of difficulty in reading in the "soft radiance" that pervades the cars.

Railways Needed in Texas.

The United States Geological Survey Press bulletin points out the need of railroads in the development of the gold fields in Alaska. The government authority might have added that railroads are also badly needed in Texas to develop our agricultural resources. We have only 27,000,000 acres of land in cultivation out of a total area of 167,000,000 acres, and the larger part of our idle land is susceptible to a high degree of cultivation; then, too, agricultural development means permanent tonnage. We have most everything in Texas which railroad investors require, except perhaps stable conditions. No railroad company will run tracks where they will be buried under the landslide of uncertainty or blockaded by the snowstorm of bitter and merciless hatred. They want the sunshine of hope and the soft winds of friendship. Let us have an era of peace and prosperity.—*Bulletin of the Texas Commercial Secretaries and Business Men's Association.*

Safety of Railway Travel.

There is an exaggerated idea of the danger of railway travel. There are a number of cities and some entire states in which records of the causes of deaths have been compiled by the Census Bureau. These are embraced in what is termed the registration area, which includes twenty-two states and the larger cities in fifteen other states. The registration area is estimated by the United States Census Bureau to embrace 63.1 per cent. of the total population of the United States. For the calendar year 1911, the Census Bureau reported 42,331 cases of accidental death, exclusive of railway accidents, in the registration area. As bearing on the comparative safety of different ways of travel, it may be noted that, as compared with 318 deaths of passengers from railway accidents in the entire United States, there were, in the registration area, 1,883 deaths from street-car accidents, 1,291 from automobile accidents, and 2,237 from accidents in connection with other vehicles. The total number of deaths in the registration area from accidents in connection with street cars, automobiles, and other vehicles in the calendar year 1911 was 5,411, or more than the total number of passengers, railway employees, and all other persons, excepting trespassers, killed in railway accidents of all kinds in the twelve months ended June 30, 1912, including accidents in railway shops.—*W. W. Finley.*

The Trainmen's Increased Pay.

The mere amount of the award is a fraction of 1 per cent. of the total railway disbursements, and could be endured. But it signifies an uneconomic distribution of railway resources. The companies are under criticism for waste and inefficiency, and here is proof that they are not allowed to be efficient in the way of all other industrial enterprises. Both their income and their outgo are ruled by powers over which they have no control. The public has taken sides with the wage earners against the corporations for motives too natural and obvious to need

enlargement. This public opinion has permeated legislatures in a manner to influence legislation. It has even penetrated the Interstate Commerce Commission. The commission no doubt has administered the law according to its best lights, but nobody has said that doubtful points were decided in the interest of the railways. In fact, the exact opposite has been said. There is reason to fear that unless the commission shall discover a light of reason like the Supreme Court, it will find itself in an indefensible position, having served the public badly through a mistaken idea that an anti-railway policy was the sure way to public favor. It is not a service to the public to compel the railways to overpay their employees, or to employ more men than they need. The railways in question have invested two billion dollars more, and have earned \$8,000,000 less during the three years since they were forbidden to advance rates, and have been compelled to increase expenses.—*New York Times.*

Remarkable Records of Two Enginemen.

H. W. McMaster, general manager of the Wheeling & Lake Erie, has called attention to the remarkable records of two of the enginemen on that road.

Michael Donovan entered the service of the Wheeling & Lake Erie as an engineer on March 11, 1883, and after over 30 years of continuous service with very few vacations, he resigned, effective October 31, 1913. The records show that during the full period of his employment he never had occasion to go to the superintendent's or master mechanic's office on a matter of discipline, and so far as can be learned he was never even reprimanded by any officer connected with either the transportation or mechanical departments. The only entries on his record are of a commendatory nature and wherein credit marks were allowed; and now at the age of 55 he leaves railroad service in perfect physical condition.

Another man of long service with the company is Ira Cowen, who has been an engineman since November 5, 1881. He was born in 1842, and after having served for three years in the army during the Civil War, was for 17 years in the service of the Atlantic & Great Western, as fireman for 2 years and engineman for 15 years, leaving that company to go to the Wheeling & Lake Erie with a clear record. During his 32 years on the Wheeling & Lake Erie his service has been continuous, with the exception of a slight interruption brought about by an injury sustained while riding on a train as a passenger. Mr. Cowen has filled the position of engineman for 47 years, without a demerit mark being placed against his record.

Chicago City Transit.

The city council of Chicago has authorized the publication of an advertisement for proposals to construct a comprehensive system of passenger subways within the city limits, to be operated independently of all existing surface and elevated transportation lines. It is proposed that these subways shall ultimately be owned by the city through the amortization of the construction debt out of earnings.

The ordinance authorizing these invitations to private capital to enter into subway construction in partnership with the city specifies certain subway routes approximating 57 miles in extent (approximately 135 miles of track). The cost estimates for these routes approximately \$96,000,000 for subway construction and \$34,000,000 for equipment, or a total of \$130,000,000.

Trainmen and Their Employers in Tennessee.*

In nearly every issue of your paper there appears an article telling of some bad railroad wreck, but I wonder if the public understands just how these men are worked. There is a federal law that says these men shall not work more than 16 hours during the 24. . . I have known cases of one drawbar being pulled out of a train and the time consumed in setting this car out was 15 minutes, and the time used by the company to run this train was five hours and 40 minutes in excess of the 16 hours allowed. I have known of cases where men were called to leave a terminal 45 minutes after a wreck had been cleared a hundred miles from the starting point of this train. They were then in-

*Extracts from letters published in the *Memphis Commercial Appeal*, October 26 and November 2.

structed to disregard the hours of service law and take the train to the terminal on account of that wreck; and then be 27 or 28 hours making the trip. They will tie you up 15 or 25 miles from your terminal, and instruct you that a crew will come after you. You stay in this sidetrack, where there is no place to go to bed and no place to get anything to eat, and when the crew comes after you and you get to the terminal, this eight or 10 hours that you have been laying around in this blind siding or some small town where every inhabitant is in bed is counted as your rest. . . . Don't blame the engineer or the flagman and have this awful charge of "murder" hanging over him when he has been on duty 40 hours without sleep or rest of any kind. We want to do right and our wives and mothers pray every night that we will prove true, but we can't do it every time if our eyes refuse to stay open. I am an engineer, I cannot give you my name, for if I did it would not be long until I would be looking for another job. They wouldn't fire me for this, but as soon as they had any little thing they could get me for they would surely do it.

REPLY.

I work daily with both train and enginemen. I am unbiased and, I believe, fair minded. I have not been wedded to railroads as a result of favoritism, and, still more happily, have been free of the yoke of unionism, which swallows up the individual and destroys man as a unit in his industrial relations (I mean unionism as practiced, and not in theory); and the sole reason I have for not having my name at the end of this letter is the suspicion that would be created in the mind of the reader that I am courting favor with the company I serve.

The public is either indifferent or is misled by such perversions of truth as set forth by your correspondent, October 26, who makes a general charge against all the railroads of three states.

[The writer here discusses the 16-hour law and the duties of the officers and the employees in the enforcement of the law; and goes on:] I would suggest to the wives and mothers referred to in the article, that if they will help the Almighty by encouraging their husbands and sons to take their rest, instead of giving their consent to their sitting around shops and stores and standing on street corners in idle conversation, or taking them out shopping, or to theaters or picture shows, or calling on them to do chores about the house, and then praying when they go out on the road without having had proper sleep, the Almighty would not have to look after them so closely while on duty. The men shirk their responsibility in failing to sleep in rest periods.

It may be of interest here to state that before this law was ever thought of the railroads had agreements with their men covering these rest periods. Some men always took their rest under this concession and were perhaps more highly regarded by their officers than the fellow whose greed and avarice drove him to work beyond his endurance, and who converted hours into dollars, regardless of his own safety or the safety of those who trusted him.

The whole article referred to suggests that locomotive engineers are without blame, are a meek, long-suffering and overworked body of men, ruled by a ruthless, man-killing, law-defying corporation. My observation is that neither term applied to either party is correct. These same men, in this territory, earn, or rather draw, from the railroads from \$150 to \$270 a month by working an average of 10 hours a day; they have less hardship and more comfort on duty than your automobile driver, your laundry wagon driver or the man who hauls your coal and wood. The railroad company pays them for every hour they work, and for many hours they do not work, and grants them every reasonable request (and many unreasonable ones, in my opinion), and labors constantly to better their working conditions. It comes in bad taste for one of their members to make false charges against the very men who furnish them employment. How much more becoming it would be to help the railroads and government to find and weed out the unworthy, unreliable drone, instead of covering up in the bosom of their fraternity the rottenness that might exist, and then attempt to pervert justice by resorting to demagogic tactics in raising the present-day cry of "tyrannous corporations."

No ingenuity will ever devise any safeguard that can entirely overcome the errors of the human mind. So long as railroads exist and men live there will be accidents. So long as those who man the trains cover up the weaknesses and shortcomings of their brothers and do not raise the standard of their fitness,

but rely upon their union, with its evil of "seniority," instead of merit and ability, there will be still more railroad accidents.

A Correction.

The place and dates of the conventions of the Master Car Builders' Association and the American Railway Master Mechanics' Association were decided at a meeting of the executive committees of the Master Car Builders' Association, the American Railway Master Mechanics' Association and the Railway Supply Manufacturers' Association, and not by the executive committee of the Railway Supply Manufacturers' Association alone as mentioned in the *Railway Age Gazette* of October 31, page 836.

Western Canada Railway Club.

At the meeting of the Western Canada Railway Club on November 10, in Winnipeg, Man., there was a continued discussion of the paper read at the previous meeting, entitled Terminal Operation in Its Relation to the Public. A paper was also read by W. J. Logan, auditor, Hudson Bay Railway, entitled Auditing of Railroads under Construction.

Railway Club of Pittsburgh.

At the meeting of the Railway Club of Pittsburgh, to be held at the Monongahela House, Pittsburgh, Pa., November 28, C. W. Garrett, secretary of the committee on workmen's compensation, Pennsylvania Lines West of Pittsburgh, will read a paper on Workingmen's Compensation, a Study in Evolution.

MEETINGS AND CONVENTIONS.

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

- AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass. Next convention, May, 1914.
- AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass. Convention, May 19, 1914, St. Louis.
- AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, New York.
- AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, East St. Louis, Ill. Next convention, April 21, Houston, Tex.
- AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.; 3d Thursday and Friday in May.
- AMERICAN ELECTRIC RAILWAY ASSOCIATION.—H. C. Donecker, 29 W. 39th St., New York.
- AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—H. G. McConaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.
- AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York. Next meeting, November 19, 1913, Chicago.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.
- AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 17-20, Chicago.
- AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago.
- AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga.
- AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.—C. W. Hunt, 220 W. 57th St., New York; 1st and 3d Wed., except June and August, New York.
- AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wenlinger, 11 Broadway, New York; 2d Tuesday of each month, New York.
- AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
- AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 20-22, 1914, New Orleans, La.
- ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—C. G. Phillips, 143 Dearborn St., Chicago. Annual meeting, May 28, Atlantic City, N. J.
- ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md. Next convention, May, 1914, St. Paul, Minn.
- ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W. Ry., Chicago.
- ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago. Next convention, May 20-23, New Orleans, La.
- ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Next meeting, December 9-10, Galveston, Tex.
- ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Detroit, Mich. Meeting with American Railway Bridge and Building Association.

Traffic News.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and Aug., Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 413 Dorchester St., Montreal, Que.; Thursday, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 North 50th Court, Chicago; 2d Monday in month, Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St., New York; 2d Thurs. in Jan. and 2d Fri. in March, May, Sept., Nov., Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—L. S. Pomerooy, Old State Capitol building, St. Paul, Minn.; 2d Monday, except June, July, August and September, St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—E. R. Dasher, Box 704, Harrisburg, Pa.; 1st Monday after second Saturday, Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—E. K. Hiles, Oliver building, Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va. Next convention, May 20-22, Galveston, Tex.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—E. S. Koller, 226 W. Adams St., Chicago; Wed. preceding 3d Thurs., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick building, Chicago. Annual convention, May 18-22, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Next convention, third Tuesday in August.

MAINTENANCE OF WAY & MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—W. G. Wilson, Lehigh Valley, Easton, Pa. Next convention, November 18-20, Louisville, Ky.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Old Colony building, Chicago.

MASTER CAR & LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass.

NATIONAL RAILWAY APPLIANCE ASSOC.—Bruce V. Crandall, 537 So. Dearborn St., Chicago. Meetings with Am. Ry. Eng. Assoc.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3rd Friday in month, except June, July and August, New York.

NORTHERN RAILROAD CLUB.—C. L. Kennedy, C. M. & St. P., Duluth, Minn.; 4th Saturday, Duluth.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria; 2d Thursday.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 2 Rector St., New York. Annual dinner, second week in December, 1913, New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Mobile & Ohio, Mobile, Ala.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOC.—J. D. Conway, 2135 Oliver bldg., Pittsburgh, Pa. Meetings with M. M. and M. C. B. Assocs.

RAILWAY TEL. & TEL. APPLIANCE ASSOC.—W. E. Harkness, 284 Pearl St., New York. Meetings with Assoc. of Ry. Teleg. Sups.

RICHMOND RAILROAD CLUB.—F. O. Robinson, Richmond, Va.; 2d Monday except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmonds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—C. Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Montgomery, Ala.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. G. Macomber, Woolson Spice Co., Toledo, Ohio; 1st Saturday, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 290 Broadway, New York; last Tuesday in month, except June, July and August, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie, Pittsburgh, Pa.; meetings monthly, Pittsburgh.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 16, Jacksonville, Fla.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, L. S. & M. S., Detroit, Mich.; meetings monthly.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, Chicago.

UTAH SOCIETY OF ENGINEERS.—Fred D. Ulmer, Oregon Short Line, Salt Lake City, Utah; 3rd Friday of each month, except July and August.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, Old Colony building, Chicago; 3d Tuesday of each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; 1st Monday in month, except July and August, Chicago.

James J. Hill, L. W. Hill and a party of officials and directors of the Hill roads, took part in the formal opening of Glacier National Park for the winter season on November 5.

Shipments of anthracite coal in October amounted to 6,665,321 tons, as against 6,338,194 tons in October, 1912, a decrease of 327,127 tons. Total shipments in the first ten months of 1913, 57,620,079 tons.

After protracted negotiations with grain shippers the Illinois Central has announced that it will grant an elevation allowance of one-fourth cent a bushel on grain shipped to Chicago from Mississippi valley points.

The "Santa Fe De Luxe" train, the 63-hour train to Southern California on the Atchison, Topeka & Santa Fe, will begin its third winter season on December 9, and will leave Chicago every Tuesday during the winter months. The train this year will be composed wholly of new cars.

The Pennsylvania Railroad has notified officers of the State of Pennsylvania that the road, under the new Public Service Commission law of that State, can no longer carry cans of young fish without charge. The Department of Fisheries says that without free transportation it will be impossible to distribute fish throughout the state, as heretofore.

The report of the Department of Agriculture, issued this week, estimates the total corn crop of the country this year, at 2,463,017,000 bushels, or about 89,000,000 bushels greater than was estimated a month ago. Reserves of corn on the farms are now estimated to amount to about 138,000,000 bushels, or more than twice the quantity reported one year ago.

It is announced that the Southern Pacific will soon make important reductions in freight rates on westbound traffic by way of San Francisco, destined for points in Asia. The reductions are said to be intended to meet lower through rates, which now prevail by way of Puget Sound and over the Canadian Pacific. The Atchison and other lines no doubt will follow any action taken by the Southern Pacific.

The Interstate Commerce Commission has changed from December 1 to February 1, the date on which the express companies must comply with the order of the commission reducing the rates for the transportation of merchandise. The commission has made some alterations in the appendices of its order of July 24, 1913, including some amendments in the rules stated in Appendix A. There are also changes in the blocks in which some shipping points are placed—for example, the suburbs of Chicago are now included in the Chicago block, and there are analogous changes for some of the suburbs of New York, Philadelphia, etc.

Joint through freight rates on commodities moving over the lines of the Southern Pacific to and from its subsidiaries, the Pacific Electric and the Visalia Electric, were announced last week. These rates, by the elimination of certain local charges, will place shippers and growers along the electric lines on a basis similar to that on steam lines, and are a new departure in California. It is said that similar arrangements with the Pacific Electric will include the San Pedro, Los Angeles & Salt Lake and the Union Pacific, and that a like arrangement will be made between the Visalia Electric and the Western Pacific.

The team owners of Philadelphia, who for a long time have been complaining of alleged neglect at the freight houses of the railroads in that city, have sent a complaint to the Interstate Commerce Commission, charging ill-treatment of this kind in many places; and they say that they have the co-operation of a team owners' association which has members in 60 large cities; and this national association, we are told, controls 350,000 horses and 4,000 automobile trucks. The Interstate Commerce Commission will give a hearing on the complaint at Philadelphia, November 25. It is claimed that freight houses are not equipped with suitable facilities and that teamsters have to expend much time and effort in hunting up freight for which they call.

National Industrial Traffic League.

A meeting of the National Industrial Traffic League has been called to be held at the Hotel La Salle, Chicago, on Thursday

and Friday, November 13 and 14. The annual dinner was to be held on Thursday evening at the Hotel La Salle with H. A. Wheeler, president of the chamber of commerce of the United States, and George T. Bell, commissioner of the traffic bureau of the Sioux City Commercial Club, as speakers.

Car Balance and Performance.

Arthur Hale, chairman of the committee on relations between railroads of the American Railway Association, in presenting statistical bulletin No. 156, covering car balances and performances for July, 1913, says:

The miles per car per day for July were 23.7, compared with 24.3 in June. This figure for July, 1912, was 23.2.

Ton miles per car per day for July were 375, compared with 377 in June. This is an increase of 3.59 per cent. over the figure for July, 1912, which was 362.

The proportion of home cars on line increased one point to 59 per cent. in July, 1913. This is also an increase of one point over the figure for July, 1912.

The per cent. of loaded car mileage decreased from 69.0 per

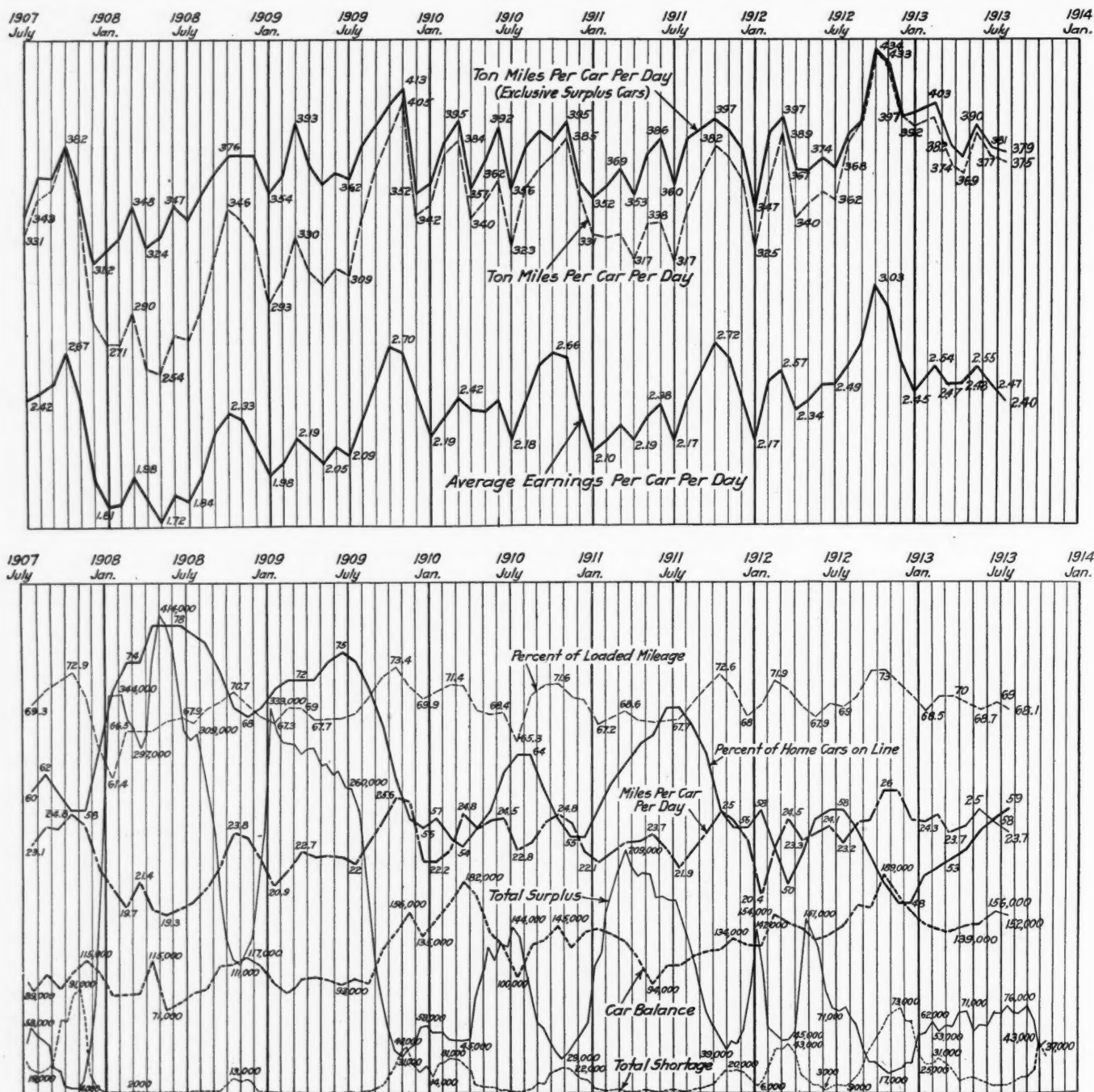
cent. in June to 68.1 per cent. in July, 1913. This figure for July, 1912, was 69.0 per cent.

The average earnings per car per day for all cars on line decreased 7 cents to \$2.40 in July, 1913. This figure for July, 1912, was \$2.49.

The table on page 931 gives the car balance and performance in the month covered by the report and the diagram shows car earnings and car mileage and different car performance figures monthly from July, 1907:

Freight Rates in North Carolina.

Pursuant to an offer made in September by the principal railways—the Southern, the Atlantic Coast Line, the Seaboard Air Line and the Norfolk & Western—freight rates from points west of Buffalo and Pittsburgh to points in North Carolina, are to be materially reduced, the legislature of the state having approved an adjustment made by the state corporation commissioners in consultation with the railroads. It is estimated that the total diminution of freight bills will amount to \$2,000,000 a year, said to be "the largest and most comprehensive concession



Freight Car Mileage, Earnings and Performance, 1907 to 1913.

CAR BALANCE AND PERFORMANCE IN JULY, 1913.

	New England.	N. Y., N. J., Del., Md., Eastern Pa.	Ohio, Ind., Mich., Western Pa.	Va., W. Va., No. and So. Carolina.	Ky., Tenn., Miss., Ala., Ga., Fla.	Iowa, Ill., Wis., Minn.	Mont., Wyo., Neb., Dakotas.	Kan., Colo., Ark., Mo., Okla., La., New Mex.	Texas, Idaho, Nev., Cal., Ariz.	Canadian Lines.	Grand Total.
Revenue freight cars owned.....	90,101	693,494	201,648	189,739	162,354	418,308	17,901	146,194	19,927	161,941	2,338,686
Average number of system cars on line.....	44,239	393,587	126,167	100,370	83,045	301,491	8,824	80,579	15,494	92,495	1,315,482
Railway-owned cars: Average foreign on line.....	49,567	295,032	103,443	68,543	57,694	140,040	8,005	61,298	15,963	40,473	880,073
Excess.....	93,806	688,619	229,610	168,913	140,739	441,531	13,829	141,877	31,457	132,968	2,195,555
Per cent. of cars on line to total owned.....	3,705	*4,875	27,962	*20,826	*21,615	23,223	*4,072	*4,317	*24,873	*28,973	*43,131
Home.....	49	57	63	53	51	72	45	55	78	67	159
Foreign.....	55	42	51	36	36	34	45	38	80	29	140
All railways.....	104	99	114	89	87	106	77	93	75	96	199
Private cars on line.....	3,960	35,034	9,858	4,705	8,984	14,779	1,955	9,100	2,026	2,549	104,954
Total, all cars on line.....	97,766	723,653	239,468	173,618	149,723	456,310	15,784	150,977	124,210	135,517	2,300,509
Per cent. of cars in shop.....	7.50	6.39	10.68	8.69	11.03	5.63	14.92	8.46	6.42	4.32	7.40
No. of freight engines owned.....	1,448	10,504	2,944	3,503	2,741	6,729	503	2,940	2,887	2,242	37,100
Average cars on line per freight engine owned.....	68	69	81	50	55	68	31	51	39	60	62
Total freight-car mileage.....	56,960,425	530,392,770	157,711,954	135,257,227	122,053,057	316,749,416	26,040,449	97,615,713	111,399,470	115,094,829	1,694,552,331
Average mileage per car per day.....	18.8	23.6	20.9	25.1	26.7	22.3	24.6	22.2	28.9	24.2	23.7
Per cent. loaded mileage.....	71.6	65.8	67.0	65.4	70.7	68.6	73.9	70.2	68.7	74.4	68.1
Ton-miles of freight, including company freight.....	668,145,666	8,821,398,185	2,755,664,363	2,252,995,396	1,747,418,728	3,576,547,506	415,801,575	1,091,290,907	346,464,174	1,626,473,887	25,265,415,658
Average ton-mile, including company freight.....	11.7	16.6	18.6	16.7	14.5	14.7	16.0	14.0	13.8	15.9	15.8
Per car-mile.....	16.4	25.3	27.7	25.5	21.4	20.0	21.4	20.0	20.0	21.4	23.2
Per loaded car-mile.....	220	393	388	419	386	328	850	312	339	385	375
Per car per day.....											
Gross freight earnings.....	\$7,015,036	\$50,840,689	\$14,566,905	\$12,163,735	\$11,105,971	\$33,472,180	\$3,008,175	\$9,879,287	\$2,776,125	\$10,299,104	\$171,615,739
Average daily earnings: Per car owned.....	\$2.51	\$2.36	\$2.33	\$2.07	\$2.21	\$2.58	\$5.42	\$2.10	\$4.49	\$3.45	\$2.40
Per railroad car on line.....	2.41	2.38	2.05	2.32	2.55	2.45	7.02	2.26	2.85	2.50	2.51
All cars on line.....	2.31	2.27	1.96	2.26	2.39	2.37	6.15	2.13	2.67	2.45	2.40

*Denotes deficiency. †23,363 cars owned eliminated in per cents.

in freight rates ever made by the railroads to any state at one time." The new rates will be put into effect as soon as the tariffs can be prepared, and the legal notice given.

But the legislature also took up the question of intrastate rates, and passed a law prescribing an entirely new tariff; and these new rates are now declared by the railroads to be unreasonably low, and confiscatory. The law provides for the appointment by the governor of a special commission to consider this complaint of the carriers and it is understood that Governor Craig will appoint this special commission this week. The new law contains 16 sections and prescribes the powers of the Corporation Commission over rates in detail. The legislature has now adjourned and the special commission has power to change the rates if they are found to be unreasonable. For the future the Corporation Commission may at any time raise the prescribed rates on roads less than 75 miles long, and, on six months' notice, may raise them on any road.

Any rate on any commodity which is lower than the new rate must be continued in force, unless raised by proper authority, as provided in the law. The Corporation Commission may regulate rates over two or more lines, and may prescribe charges for transfer of goods at junctions. Overcharges due to rates illegally excessive must be refunded within 30 days after written demand, or the carrier will be liable to double the amount of the overcharge, and to a penalty of \$10 a day for delay.

The Corporation Commission is directed to require the railroads to keep separate the cost of doing interstate and intrastate business and to keep separate the receipts from both these classes of business.

The first class rate prescribed by the law for five miles is 12 cents; 10 miles, 13.5 cents; 20 miles, 16 cents; 50 miles, 23 cents; 100 miles, 33.5 cents; 150 miles, 43.5 cents; 200 miles, 53.5 cents; 300 miles, 63 cents; 400 miles, 72.5 cents. Cotton, per 100 lbs., 10 miles, 7 cents; 50 miles, 11 cents; 100 miles, 16.5 cents; 150 miles, 21.5 cents; 200 miles, 26.5 cents; 300 miles, 34 cents; 400 miles, 36.5 cents.

INTERSTATE COMMERCE COMMISSION.

The commission has suspended from November 15 until March 12, about 21,000 tariffs which proposed to increase freight rates in official classification territory by 5 per cent. Hearings in regard to the reasonableness of the advances will be begun in Washington, D. C., on November 24.

The commission suspended from November 10 until March 10 the item in Agent F. A. Leland's tariff, which proposes to cancel the present commodity rate of 56 cents per 100 lbs. on shipments of peanuts, c. l., minimum weight 30,000 lbs., from New Orleans and certain other points in Louisiana to Oklahoma City, Okla. The proposed class rate on peanuts, c. l., minimum weight 24,000 lbs., is 90 cents per 100 lbs.

Rehearing Denied.

John Taylor Dry Goods Co. et al. v. Missouri Pacific et al. Opinion by Commissioner Prouty:

The commission denied the petition of the complainant for a rehearing in this case. The original decision was abstracted in the *Railway Age Gazette* of August 15, 1913, page 310. (28 I. C. C., 308.)

An Absurd Complaint Dismissed.

Haverhill Box Board Company v. Boston & Maine, et al. Opinion by Commissioner Prouty:

In this case the complainant asks the commission to establish a through route and through rate between Haverhill, Mass., and Boston, via Wyndham, N. H., for the movement of its traffic. Hitherto this traffic has moved from Haverhill to Boston over the direct line of the Boston & Maine. The rate on box boards between these points, 33 miles, is 7 cents per 100 lbs. The complainant seeks to have this rate reduced, but has been unsuccessful in its attempts to have it reduced over the direct line, which lies entirely in the state of Massachusetts. The commission decided that it would not be justified in compelling the defendant to establish a through route over a long circuitous route when a short direct route was available. (28 I. C. C. 336.)

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF SEPTEMBER, 1913.

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decrease) comp. with last year.
		Freight.	Passenger.	Total.	Way and structures.	Maintenance of equipment.	Traffic.					
Alabama & Vicksburg.....	143	\$99,944	\$41,993	\$152,813	\$19,272	\$27,319	\$4,182	\$5,855	\$109,825	\$7,450	\$35,295	\$2,409
Ann Arbor.....	292	121,930	49,796	183,856	22,289	22,289	4,509	6,327	120,569	13,530	38,462	6,127
Arizona & New Mexico.....	109	67,878	9,459	81,396	1,380,851	1,380,851	177,420	3,131	39,146	3,400	38,850	8,395
Atchafalaya, Topeka & Santa Fe.....	8,337	5,451,733	2,107,128	8,147,733	1,177,184	1,380,851	177,420	185,015	5,119,751	376,189	2,631,793	44,602
Atlanta & West Point.....	33	56,601	42,000	108,686	14,116	22,509	4,996	4,790	78,775	6,484	23,824	5,399
Atlanta, Birmingham & Atlantic.....	645	209,815	54,514	287,091	45,965	47,912	14,339	11,209	227,353	14,337	45,401	5,682
Atlantic Coast Line.....	4,618	1,788,589	667,987	2,642,406	432,338	480,622	45,510	105,320	2,032,587	132,000	478,819	52,333
Baltimore & Ohio Chicago Terminal.....	631	234,754	782	152,830	20,271	22,321	736	5,111	112,489	16,052	21,835	4,071
Bangor & Aroostook.....	21	.....	.....	322,658	34,504	45,981	2,483	11,783	197,274	9,738	13,184	3,460
Belt Ry. Co. of Chicago.....	204	948,636	49,017	1,010,087	82,593	207,619	7,838	6,758	161,285	9,687	70,356	22,479
Bessemer & Lake Erie.....	204	888	8,810	106,232	12,457	12,457	544	4,412	53,623	38,000	36,188	1,008
Birmingham Southern.....	252	134,515	8,810	147,346	31,599	21,664	1,808	5,434	110,938	2,200	36,408	3,095
Buffalo & Susquehanna Railroad.....	91	35,142	10,642	48,626	12,326	194,998	12,281	2,564	67,065	1,600	20,036	1,852
Buffalo, Rochester & Pittsburgh.....	576	901,737	108,013	1,047,265	139,431	194,998	12,281	19,678	701,072	18,000	328,039	51,039
Carolina, Clinchfield & Ohio.....	248	208,478	19,416	234,323	17,430	27,156	7,771	8,701	102,075	9,250	122,998	15,831
Central of Georgia.....	1,924	835,731	307,277	1,239,962	150,201	233,522	34,567	37,875	862,942	50,466	828,350	10,181
Central of New Jersey.....	676	1,798,782	512,442	2,410,971	265,669	387,336	33,224	42,747	1,464,059	111,118	828,350	41,440
Central New England.....	304	277,353	47,959	340,245	54,179	38,736	1,410	5,227	185,556	10,500	144,388	38,469
Charleston & Western Carolina.....	341	126,280	30,552	164,313	34,312	32,807	60,875	4,240	135,621	5,000	23,692	4,534
Chesapeake & Ohio Lines.....	2,343	3,774,050	611,075	3,122,153	374,528	610,705	53,860	70,481	2,061,873	109,960	952,699	69,959
Chicago & Alton.....	1,932	910,887	383,793	1,389,990	173,123	288,383	38,321	36,146	1,016,090	40,600	373,341	37,341
Chicago & Erie.....	1,970	381,812	65,475	485,722	110,641	188,625	20,152	11,923	488,578	16,029	23,438	55,577
Chicago & North Western.....	8,003	5,123,043	2,103,417	7,868,878	1,120,324	1,098,278	116,232	138,856	5,181,018	320,000	2,375,336	42,611
Chicago, Burlington & Quincy.....	9,129	6,012,719	2,199,834	8,372,118	1,145,404	1,378,387	136,759	211,185	5,492,806	304,275	3,165,261	271,396
Chicago, Great Western.....	1,496	943,425	327,270	1,350,566	237,686	210,552	51,460	35,430	959,037	38,650	369,926	1,804
Chicago, Indiana & Southern.....	359	306,605	31,884	350,566	64,022	110,552	8,433	10,186	310,256	13,282	58,984	37,872
Chicago Junction.....	12	.....	.....	140,838	28,715	36,972	6,999	3,597	124,306	2,348	58,984	8,604
Chicago, Peoria, & St. Louis.....	255	106,319	25,458	140,838	28,715	36,972	6,999	5,167	147,737	4,800	11,699	22,358
Chicago, Rock Island & Gulf.....	477	159,776	57,449	234,948	23,535	42,812	10,123	7,695	170,520	12,220	51,264	31,596
Chicago, Rock Island & Pacific.....	755	3,746,950	1,820,894	5,567,844	757,134	824,988	159,958	156,085	4,125,163	284,363	1,500,718	5,220
Chicago, St. Paul, Minneapolis & Omaha.....	1,727	1,061,822	565,962	1,717,426	314,441	184,773	28,926	36,993	1,552,886	11,568	497,347	3,684
Chicago, Terre Haute & Southeastern.....	362	175,224	17,123	196,740	29,636	37,630	3,606	7,863	157,510	8,350	47,338	9,850
Cincinnati, Hamilton & Dayton.....	1,013	661,920	168,804	930,970	156,343	145,008	25,589	20,126	759,854	34,713	136,403	125,762
Cincinnati, Northern.....	245	115,105	22,503	143,437	29,546	34,451	3,023	3,683	129,939	5,500	7,998	18,640
Cleveland, Cincinnati, Chic. & St. Louis.....	2,013	2,019,439	814,993	3,086,916	398,858	801,671	75,144	57,526	2,556,414	103,800	429,270	44,377
Colorado Midland.....	338	161,020	29,484	190,504	29,774	36,710	8,423	6,086	162,153	8,000	31,143	39,150
Cumberland Valley.....	62	236,473	65,236	315,674	74,218	35,733	4,479	9,065	222,405	5,702	37,620	26,227
Delaware, Lackawanna & Western.....	959	2,550,463	827,998	3,602,292	482,913	543,584	76,793	63,683	2,213,139	165,000	1,247,261	48,532
Denver & Salt Lake.....	215	94,278	36,131	136,864	17,083	14,789	2,274	3,298	75,119	4,000	57,745	12,123
Detroit & Mackinac.....	411	64,325	30,845	101,797	15,394	17,684	2,046	2,862	75,061	8,379	7,557	10,548
Detroit, Toledo & Ironton.....	441	101,375	12,433	126,086	4,794	4,351	2,573	38	18,036	6,000	7,557	1,664
Duluth & Iron Range.....	272	971,857	22,699	1,003,378	90,899	83,382	892	15,086	378,582	55,384	57,351	1,855
Duluth, Missabe & Northern.....	356	1,240,391	33,106	1,283,233	97,345	89,519	2,270	26,955	397,097	73,877	816,398	77,582
El Paso & Southwestern Co.....	382	554,913	90,192	676,368	138,144	97,481	15,481	12,827	467,162	35,000	172,321	20,747
Elgin, Joliet & Eastern.....	803	1,091,597	4	1,161,537	175,437	97,481	5,426	17,181	726,852	33,850	400,835	25,405
Erie.....	1,988	3,421,319	886,197	4,648,481	670,353	866,372	106,131	101,221	3,297,650	162,364	1,149,693	339,513
Florence & Cripple Creek.....	87	86,536	20,054	108,808	14,692	10,009	2,108	4,159	58,671	1,679	48,458	3,685
Georgia, Southern & Florida.....	395	121,381	74,566	216,446	26,295	41,913	7,475	9,677	169,917	23,641	35,871	11,410
Grand Rapids & Indiana.....	578	281,973	227,569	545,013	67,546	69,792	11,977	14,922	374,442	7,050	146,447	22,257
Gulf & Ship Island.....	308	139,123	34,601	183,894	20,636	32,443	3,006	8,227	109,779	7,115	7,050	67,065
Gulf, Colorado & Santa Fe.....	1,596	872,599	251,468	1,192,824	185,616	184,300	26,421	31,145	850,216	55,681	286,927	136,182
Illinois Central.....	4,763	3,845,625	1,242,348	5,812,253	871,768	1,348,873	106,931	121,796	4,421,371	264,000	1,128,166	85,261
Indiana Harbor Belt.....	105	38,377	38,377	76,754	47,776	40,745	2,948	7,666	227,860	5,439	44,694	4,216
Indiana & Michigan.....	177	256,256	38,377	301,487	45,847	67,118	83,263	6,550	205,126	9,433	86,989	16,087
Kanawha & Michigan.....	177	256,256	38,377	301,487	45,847	67,118	83,263	6,550	205,126	9,433	86,989	16,087
Kansas City Southern.....	827	679,153	145,885	878,644	80,635	111,606	28,623	33,019	538,015	40,013	300,616	44,238
Lake Erie & Western.....	906	437,805	86,446	556,514	29,614	112,058	204,155	12,345	430,102	22,180	104,234	65,954
Lake Shore & Michigan Southern.....	1,872	3,241,533	1,292,530	5,072,714	689,398	1,027,827	91,960	99,398	3,544,591	150,000	1,593,015	36,512
Lehigh & Hudson River.....	97	131,023	4,855	144,074	30,907	21,223	1,274	5,113	110,523	4,000	29,351	17,687

REVENUES AND EXPENSES OF RAILWAYS.

MONTH OF SEPTEMBER, 1913.—CONTINUED.

Name of road.	Average mileage operated during period.	Operating revenues			Maintenance		Operating expenses			Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decrease) comp. with last year.
		Freight.	Passenger.	Total.	Way and structures.	Of equipment.	Traffic.	Portation.	General.	Total.				
Lehigh & New England.....	269	\$155,344	\$1,200	\$160,511	\$23,207	\$20,629	\$1,387	\$39,871	\$3,543	\$88,637	\$71,874	\$3,178	\$68,696	\$3,605
Lehigh Valley.....	1,438	2,987,141	463,203	3,585,997	434,117	564,394	83,840	1,205,261	12,044	2,360,006	1,225,991	121,000	1,078,561	281,110
Long Island.....	1,399	288,436	739,696	1,028,132	134,572	120,023	17,810	491,386	31,703	794,994	357,341	63,660	292,226	84,206
Louisiana Ry. & Navigation.....	351	126,293	23,939	150,232	31,323	16,986	6,936	68,943	5,710	129,904	31,391	5,500	25,891	9,284
Louisville & Nashville.....	4,923	3,809,455	1,166,729	5,293,544	691,663	1,039,437	102,258	1,739,539	110,635	3,683,562	1,609,982	150,608	1,460,749	89,927
Louisville, Henderson & St. Louis.....	200	76,923	39,391	124,026	21,242	13,874	4,429	39,027	3,015	81,587	42,439	3,600	39,066	17,216
Maine Central.....	1,207	616,304	386,518	1,002,822	183,759	150,671	9,023	386,486	26,031	755,960	313,814	116,000	267,880	37,186
Michigan Central.....	1,819	1,931,339	964,989	3,509,774	530,771	541,535	70,797	1,213,533	50,411	2,427,047	742,821	116,000	625,575	214,234
Midland Valley.....	1,373	102,090	39,746	150,179	31,601	16,470	2,629	51,069	6,819	122,795	27,384	5,987	21,395	10,585
Minneapolis & St. Louis.....	1,586	648,967	210,042	905,985	129,476	106,700	17,859	297,297	19,838	581,170	324,815	32,407	292,342	8,233
Missouri & North Arkansas.....	365	65,385	43,270	115,537	25,030	19,617	3,704	40,121	5,687	94,159	21,378	5,500	15,878	14,753
Missouri, Okla. & Gulf Ry. Co. of Texas.....	19	7,122	482	7,604	1,250	488,496	62,505	998,811	71,086	2,033,460	491,229	93,390	337,397	75,560
Missouri Pacific.....	3,920	1,871,640	447,119	2,524,689	412,603	222,355	37,755	387,195	31,088	815,156	236,790	33,881	291,637	28,766
Mobile & Ohio.....	1,122	868,161	128,168	1,051,946	136,763	107,727	348	257,883	2,103	55,293	75,428	2,350	73,078	4,526
Monongahela.....	67	126,244	2,726	130,721	16,232	10,727								
Monongahela Connecting.....	6	93,205		93,205	11,151	19,771	300	40,932	2,498	74,632	18,553	2,760	15,793	14,459
Nashville, Chattanooga & St. Louis.....	1,231	699,308	282,276	1,055,938	164,259	199,219	39,717	393,871	27,778	825,544	230,394	25,340	204,749	24,041
Nevada Northern.....	1,665	132,105	13,079	148,894	18,778	18,186	315	34,999	4,344	76,622	72,272	6,776	65,496	6,732
New Orleans & North Eastern.....	196	246,446	54,450	321,906	35,196	73,201	11,055	123,564	11,943	252,959	68,947	15,800	52,661	18,758
New Orleans Great Northern.....	283	111,920	33,070	156,772	21,118	15,546	3,049	47,162	7,231	95,106	61,666	2,334	59,210	59,210
New Orleans, Mobile & Chicago.....	2,093	138,243	31,674	180,008	22,482	18,331	3,392	55,915	7,021	107,151	72,857	7,198	65,521	10,465
New York, New Haven & Hartford.....	403	2,854,343	2,615,215	6,078,438	822,434	836,924	36,347	2,287,926	144,949	4,128,740	1,949,698	280,000	1,681,723	565,689
New York, Susquehanna & Western.....	2,154	180,647	47,756	254,065	40,428	31,850	2,455	100,864	6,660	182,199	71,866	13,970	132,874	43,411
Norfolk & Western.....	2,035	3,425,694	487,717	4,060,680	503,419	821,618	61,282	1,241,012	73,370	2,700,701	1,359,979	125,000	1,252,874	96,955
Norfolk Southern.....	472	914,544	237,387	1,227,281	156,013	258,274	20,092	561,188	29,004	1,024,571	202,710	43,500	159,735	16,955
Northern Central.....	6,312	5,112,065	1,625,049	7,156,454	996,224	1,381,523	118,726	2,068,741	83,144	4,051,358	3,105,096	375,293	2,784,007	160,398
Northern Pacific.....	4,001	1,617,443	177,421	3,627,955	52,343	3,654	119,534	500,432	11,855	228,053	134,742	15,100	108,642	118,642
Northwestern Pacific.....	2,093	1,630,138	488,721	2,244,441	243,999	31,850	35,059	500,432	52,868	1,064,208	1,180,235	130,800	1,048,436	45,959
Oregon Short Line.....	1,751	4,531,779	1,018,509	6,125,016	800,051	1,072,197	83,435	2,113,440	108,344	4,177,467	1,947,549	254,359	1,686,333	36,949
Pennsylvania Co.....	1,751	4,531,779	1,018,509	6,125,016	800,051	1,072,197	83,435	2,113,440	108,344	4,177,467	1,947,549	254,359	1,686,333	36,949
Pennsylvania Railroad.....	4,032	11,661,133	3,527,027	16,390,336	2,036,802	3,321,033	229,287	5,678,462	389,275	11,654,879	4,735,457	155,744	3,591,584	90,607
Peoria & Eastern.....	282	168,636	10,552	181,954	38,570	64,776	5,908	112,379	5,840	227,473	83,053	10,400	72,653	15,291
Pere Marquette.....	352	938,930	410,607	1,486,184	237,149	329,727	3,646	604,900	41,276	1,246,692	239,492	17,182	187,207	215,123
Philadelphia, Baltimore & Washington.....	2,713	901,851	780,486	1,846,669	289,397	320,301	4,156	746,333	52,135	1,450,862	395,807	57,000	388,600	72,590
Pittsburgh & Lake Erie.....	223	1,476,917	167,439	1,705,509	167,392	311,090	12,290	408,096	29,307	930,175	113,934	6,275	79,078	78,737
Pittsburgh, Cincinnati, Chic. & St. Louis.....	1,472	2,755,022	890,730	4,060,780	606,115	751,112	67,815	1,531,451	76,454	3,014,947	1,043,833	135,094	1,132,744	86,607
Pittsburgh, Shawmut & Northern.....	488	99,057	85,710	181,954	53,511	49,678	1,670	64,483	5,085	174,427	7,527	1,826	5,701	36,367
Richmond, Fredericksburg & Potomac.....	408	168,883	147,693	321,350	36,031	19,517	8,929	121,726	6,843	247,416	59,917	17,182	91,078	11,124
Rutland.....	316	84,639	30,059	125,786	28,604	19,517	5,195	54,386	6,250	113,952	11,834	6,275	5,948	7,621
St. Joseph & Grand Island.....	472	2,581,017	944,930	3,772,638	515,911	599,068	69,844	1,230,064	89,913	2,504,800	1,267,838	135,094	1,132,744	86,607
St. Louis & San Francisco.....	518	141,387	75,605	241,804	42,966	23,850	4,577	73,212	10,151	154,756	87,048	5,500	81,548	18,561
St. Louis, Brownsville & Mexico.....	3,365	2,029,321	536,423	2,769,930	483,142	483,142	52,027	839,683	70,280	1,871,221	898,684	97,285	796,328	112,188
St. Louis, Iron Mountain & Southern.....	448	70,464	49,577	126,238	28,993	29,579	2,387	51,331	5,069	113,952	33,981	1,225	32,756	5,988
St. Louis, San Francisco & Texas.....	444	547,959	126,232	713,183	65,318	138,117	28,517	166,191	24,950	431,293	289,890	30,232	258,132	37,197
St. Louis & Southwestern.....	724	411,743	138,335	573,737	75,818	69,626	6,883	175,393	11,582	339,302	234,435	12,000	222,435	63,759
San Antonio & Aransas Pass.....	3,082	1,287,623	413,379	1,895,289	241,959	266,455	59,597	717,335	62,026	1,348,272	547,017	82,000	464,320	99,148
Seaboard.....	281	58,619	32,867	99,372	23,581	10,683	2,387	42,386	3,963	83,000	16,372	6,812	9,366	8,512
Southern in Mississippi.....	291	97,569	16,304	119,623	19,214	19,458	2,039	35,809	3,492	80,012	39,611	4,473	35,138	39,063
Southern Kansas of Texas.....	294	99,376	39,854	147,467	27,081	14,221	5,923	48,849	7,434	103,508	43,959	4,246	39,713	8,247
Tennessee Central.....	443	495,042	72,184	601,889	75,723	108,515	6,710	209,884	10,001	410,833	191,056	19,109	171,613	25,114
Toledo & Ohio Central.....	448	70,464	49,577	126,238	28,993	29,579	2,387	51,331	5,069	113,952	33,981	1,225	32,756	5,988
Toledo, Peoria & Western.....	431	320,158	34,509	378,251	43,556	55,244	16,299	128,784	3,682	49,254	12,385	5,000	7,385	21,172
Toledo, St. Louis & Western.....	463	170,660	47,295	226,104	54,624	30,572	10,035	208,994	12,028	268,994	171,110	6,995	108,866	14,683
Trinity & Brazos Valley.....	31	121,765	26,733	150,016	11,608	1,186	1,866	5,360	4,220	358,435	120,420	11,000	111,609	7,843
Union Railroad of Pennsylvania.....	0	121,765	26,733	150,016	11,608	1,186	1,866	5,360	4,220	358,435	120,420	11,000	111,609	7,843
Union Railroad of Baltimore.....	171	32,302	42,701	75,003	26,933	29,473	3,622	47,088	5,337	74,706	24,875	7,320	22,956	3,085
Vielsburg, Shreveport & Pacific.....	36	162,396	405,262	616,531	99,468	108,378	20,569	256,560	14,619	499,594	116,937	27,610	83,494	45,309
Washington Southern.....	356	721,083	820,944	1,542,027	153,894	141,734	8,821	233,240	19,373	557,062	263,266	181	4,838	37,824
West Jersey & Seashore.....	133	76,702	46,178	126,944	19,444	13,959	5,953	33,488	5,578	89,478	42,481	4,338	230,215	19,410
Western Ry. of Alabama.....	459	721,083	820,944	1,542,027	153,894	141,734	8,821	233,240	19,373	557,062	263,266	181	4,838	37,824
Wheeling & Lake Erie.....	1,372	703,169	232,410	1,007,050	168,630	175,619	16,875	368,607	26,201	755,932	251,118	43,000	207,877	83,834
Yazoo & Mississippi Valley.....	1,372	703,169	232,410	1,007,050	168,630	175,619	16,875	368,607	26,201	755,932	251,118	43,000	207,877	83,834

REVENUES AND EXPENSES OF RAILWAYS.

THREE MONTHS OF FISCAL YEAR, 1914.

Name of road.	Average mileage operated during period.	Operating revenues			Maintenance—			Operating expenses			Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or decr.) last year.	Increase (or decr.) last year.
		Total.	Passenger.	Freight.	Total.	Way and structures.	Of equipment.	Traffic.	Portation.	General.	Total.				
Alabama & Vicksburg.....	143	\$281,854	\$133,765	\$449,674	\$64,960	\$95,611		\$11,630	\$159,987	\$17,274	\$349,462	-\$2,063	\$22,350	\$75,799	-\$25,323
Ann Arbor.....	292	347,090	176,298	561,018	72,166	122,151		14,242	186,836	19,539	364,998	153	41,790	154,077	7,170
Arizona & New Mexico.....	109	206,974	27,078	243,249	39,544	26,321		2,322	46,738	8,673	123,598	.....	10,200	111,451	-41,883
Atchison, Topeka & Santa Fe.....	8,357	15,706,991	6,532,546	23,983,256	3,705,537	4,234,053		514,904	6,559,563	546,682	15,560,759	.....	1,127,076	7,295,421	-27,720
Atlanta & West Point.....	93	146,187	130,292	304,699	48,246	65,459		15,241	95,573	14,106	238,625	752	19,453	47,373	-15,274
Atlanta, Birmingham & Atlantic.....	645	555,551	185,494	803,911	132,298	145,541		41,899	316,668	32,615	699,021	.....	43,011	91,879	20,148
Atlantic Coast Line.....	4,618	4,832,610	2,048,087	7,431,274	1,284,278	1,410,460		291,957	6,044,606	291,957	6,044,606	.....	396,000	990,668	-259,979
Baltimore & Ohio Chicago Terminal.....	77	.....	2,636	462,178	62,799	61,269		14,939	342,473	32,871	554,492	2,905	48,155	74,525	-7,831
Bangor & Aroostook.....	631	524,448	199,672	765,571	121,476	128,421		7,578	264,146	32,871	554,492	.....	29,273	182,206	-8,000
Belt Ry. Co. of Chicago.....	21	.....	.....	753,892	67,473	98,884		1,659	294,759	19,360	482,135	.....	29,213	242,544	-50,729
Bessemer & Lake Erie.....	204	2,944,552	157,034	3,138,698	262,874	508,937		29,976	679,320	33,763	1,514,870	.....	114,000	1,509,828	-51,470
Birmingham Southern.....	43	201,649	3,227	336,856	46,011	39,488		1,608	110,528	12,932	210,567	.....	5,415	120,874	27,433
Buffalo & Susquehanna Railroad.....	252	414,956	28,359	455,142	88,586	67,861		4,173	152,513	17,581	330,654	.....	6,600	117,888	10,182
Buffalo & Susquehanna Ry.....	91	114,688	38,899	163,507	33,412	84,742		1,500	64,181	8,285	192,120	21	4,800	34,392	-14,455
Buffalo, Rochester & Pittsburgh.....	576	2,704,861	379,746	3,204,033	462,677	586,747		37,304	1,033,916	59,651	2,170,295	460	54,000	980,198	108,631
Carolina, Clinchfield & Ohio.....	248	626,599	66,753	709,629	49,903	78,787		21,011	124,198	25,851	299,750	.....	27,750	382,129	41,249
Carolina, Clinchfield & Ohio Ry. Co. of S. C.....	18	33,903	5,600	40,335	1,755	264		4,258	7,449	1,643	15,369	.....	2,250	22,716	5,246
Central of Georgia.....	1,924	1,990,678	1,007,231	3,248,044	486,885	717,158		103,738	1,153,492	116,141	2,577,414	21,513	151,206	540,937	-218,708
Central of New Jersey.....	676	5,224,040	1,815,413	7,303,277	786,446	1,110,722		105,007	1,274,870	130,978	4,308,023	171,430	316,428	2,850,256	-393,962
Central New England.....	304	767,605	123,417	929,890	149,864	103,678		3,564	241,449	16,140	514,695	832	31,500	384,527	-101,111
Charleston & Western Carolina.....	341	346,514	99,038	466,010	95,274	83,888		9,870	180,501	13,079	382,612	.....	15,000	68,398	31,652
Chesapeake & Ohio Lines.....	2,343	7,018,819	1,804,232	9,228,672	1,098,737	1,746,789		164,962	2,872,016	222,178	6,104,682	3,885	329,880	2,797,995	-1,698,700
Chicago & Alton.....	1,032	2,670,894	1,237,627	4,191,629	523,875	796,702		116,631	1,450,934	104,715	2,992,855	7,397	118,600	1,072,777	66,983
Chicago & Erie.....	270	1,074,011	203,756	1,402,605	304,473	335,298		37,754	692,634	35,803	1,431,962	.....	41,819	86,101	-42,100
Chicago & North Western.....	8,003	14,687,582	6,336,715	22,992,536	3,834,376	3,210,308		371,731	8,070,078	422,374	15,908,867	8,833	960,000	6,132,502	-115,502
Chicago, Burlington & Quincy.....	9,129	16,990,146	6,660,578	25,786,645	3,445,264	4,222,030		430,617	7,555,822	497,021	16,150,754	36,990	912,825	8,686,076	205,491
Chicago Great Western.....	1,496	2,611,284	979,753	3,870,490	592,979	728,655		151,793	1,279,808	106,469	2,709,701	2,476	115,951	1,047,311	85,903
Chicago, Indiana & Southern.....	359	902,768	96,342	1,032,861	170,463	331,797		22,311	350,866	31,123	906,560	3,536	45,848	83,989	84,627
Chicago Junction.....	12	.....	.....	535,914	59,483	17,269		3,472	263,866	10,864	354,626	.....	7,622	173,666	11,514
Chicago, Peoria & St. Louis.....	255	294,797	97,093	416,699	77,035	99,693		20,250	192,975	15,226	403,179	.....	14,400	2,880	-54,218
Chicago, Rock Island & Gulf.....	477	483,985	178,194	717,566	88,257	119,994		30,514	272,149	23,375	534,289	3,617	28,089	151,571	-61,724
Chicago, Rock Island & Pacific.....	7,525	11,000,211	5,493,944	17,568,704	2,695,130	2,610,819		480,888	6,704,279	453,300	12,944,415	4,402	835,599	3,744,288	-81,855
Chicago, St. Paul, Minneapolis & Omaha.....	1,747	2,777,795	1,568,644	4,638,214	902,815	568,006		88,810	1,677,248	1,677,248	3,338,533	1,238	228,149	1,083,856	-24,563
Chicago, Terre Haute & Southeastern.....	362	452,762	57,202	522,500	90,433	126,343		9,470	157,930	24,993	408,569	.....	34,500	78,488	4,851
Cincinnati, Hamilton & Dayton.....	1,015	1,948,857	522,275	2,782,995	437,763	438,817		68,122	1,249,640	60,355	2,254,697	.....	104,137	424,161	-37,130
Cincinnati Northern.....	245	296,476	79,720	394,815	84,027	111,738		8,104	167,591	10,415	381,875	.....	16,500	3,560	-70,335
Cleveland, Cincinnati, Chic. & St. Louis.....	2,014	6,006,497	2,562,801	9,348,331	1,505,029	2,375,660		223,836	3,749,805	185,270	8,039,795	7,176	311,400	1,004,507	-518,186
Colorado Midland.....	338	368,197	103,535	500,326	104,980	111,499		26,067	210,449	17,392	470,387	.....	24,000	5,013	-59,687
Cumberland Valley.....	162	651,346	210,474	900,172	206,809	87,951		14,802	287,538	24,652	621,752	361	17,107	261,674	-42,074
Delaware, Lackawanna & Western.....	959	7,523,553	2,589,381	10,788,119	1,608,200	1,622,300		221,138	3,107,091	199,403	6,758,132	93,823	495,000	3,628,810	-43,694
Denver & Salt Lake.....	215	227,296	183,945	431,914	63,139	50,432		10,122	107,441	11,707	242,841	.....	12,000	177,073	41,738
Detroit & Mackinac.....	411	203,861	105,393	330,367	40,748	45,498		7,865	116,447	7,865	217,734	1,295	25,279	88,649	8,277
Detroit, Toledo & Ironton.....	441	327,642	47,045	408,279	115,028	180,687		7,452	226,523	17,012	546,702	.....	17,100	155,523	-249,445
Detroit River Tunnel.....	2	.....	.....	316,096	10,678	10,371		.....	26,628	112	121,942	.....	18,000	250,307	19,888
Duluth & Iron Range.....	272	3,274,343	74,722	3,378,560	305,319	231,836		3,750	637,603	38,430	1,216,942	23,338	184,816	2,000,140	98,802
Duluth, Missabe & Northern.....	356	3,732,929	104,896	3,866,836	309,736	296,936		7,221	581,530	34,490	1,229,913	16,981	221,021	2,432,883	351,554
El Paso & Southwestern Co.....	982	1,664,310	292,779	2,047,293	382,185	297,964		45,972	706,628	80,046	1,376,795	4,803	105,000	560,695	-233,931
Elgin, Joliet & Eastern.....	803	3,184,361	12	3,402,056	540,099	631,697		15,297	923,532	55,073	2,165,698	.....	89,150	1,147,208	-343,233
Erie.....	1,988	10,213,982	2,964,184	14,241,136	1,992,851	2,502,251		316,026	4,588,617	323,539	9,723,284	74,108	439,457	4,004,287	-846,922
Florence & Cripple Creek.....	87	238,270	94,039	358,850	50,315	27,867		7,487	88,331	12,363	186,363	.....	5,291	167,196	12,850
Grand Rapids & Indiana.....	375	328,118	207,201	602,047	78,398	124,633		23,624	254,375	47,718	1,167,698	.....	31,973	60,566	-16,140
Gulf & Ship Island.....	308	399,055	118,889	1,602,078	62,851	90,001		8,252	645,840	24,358	322,439	.....	70,202	365,585	-48,064
Gulf, Colorado & Santa Fe.....	1,596	2,429,196	869,930	3,496,565	612,798	559,661		78,419	1,270,032	94,054	2,614,964	.....	153,425	728,176	-237,186
Illinois Central.....	4,763	10,891,962	3,752,673	16,776,696	2,602,638	3,862,053		314,099	5,918,225	393,529	13,090,544	-5,721	792,000	2,888,431	-306,243
Indiana Harbor Belt.....	105	.....	.....	825,915	138,195	102,509		9,024	176,607	22,728	649,308	8,641	16,500	168,748	-68,423
Kanawha & Michigan.....	177	788,319	109,345	917,541	136,678	189,106		7,866	251,282	20,509	605,441	14	28,439	283,675	-83,181
Kansas City Southern.....	827	1,881,338	472,905	2,608,078	232,148	344,833		81,567	848,227	98,492	1,605,267	.....	120,039	882,772	-57,245
Lake Erie & Western.....	906	1,232,922	273,587	1,599,050	343,916	309,436		36,805	1,289,614	36,805	1,289,614	.....	66,457	242,979	-155,504
Lake Shore & Michigan Southern.....	1,872	9,505,059	4,044,711	15,168,265	2,198,762	2,897,022		277,409	4,820,115	283,361	10,476,669	52,458	450,000	4,294,054	-816,613
Lehigh & Hudson River.....	97	401,883	16,526	444,815	105,524	63,857		4,059	164,733	12,065	350,238	.....	12,000	82,577	-47,754

REVENUES AND EXPENSES OF RAILWAYS.

THREE MONTHS OF FISCAL YEAR, 1914—CONTINUED.

Name of road.	Average mileage operated during period.	Operating revenues				Operating expenses				Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Inc. misc.	Total.	Way and structures.	Maintenance of equipment.	Traffic.	Trans- portation.					
Lehigh & New England.....	269	\$422,523	\$4,587	\$439,479	\$439,479	\$67,921	\$63,055	\$4,395	\$111,760	\$237,338	.....	\$9,536	\$172,605	\$35,465
Lehigh Valley.....	1,438	1,742,423	1,822,213	10,705,994	12,770,630	1,270,339	1,270,339	268,913	3,523,650	7,019,132	.....	363,000	3,235,351	715,703
Long Island.....	399	808,592	2,621,989	4,055,122	7,485,703	425,544	348,114	20,178	2,000,900	2,377,322	.....	190,980	1,477,809	128,765
Louisiana Ry. & Navigation.....	351	382,679	3,630,346	15,310,985	19,043,010	95,864	3,110,051	318,255	5,138,102	11,383,832	.....	16,500	84,427	44,710
Louisville & Nashville.....	4,923	10,791,576	3,630,346	15,310,985	19,043,010	2,066,086	3,110,051	318,255	5,138,102	11,383,832	.....	451,825	3,475,559	98,091
Louisville, Henderson & St. Louis.....	200	215,241	117,325	352,772	70,385	70,385	42,603	12,868	111,147	246,184	604	10,800	96,392	59,257
Maine Central.....	1,207	1,710,829	1,223,578	9,193,734	11,928,141	545,959	433,472	35,542	1,158,386	2,255,807	.....	348,000	726,964	114,176
Michigan Central.....	1,819	5,418,166	2,924,628	9,193,734	11,928,141	1,564,228	1,580,589	206,554	3,624,697	7,134,800	.....	17,960	1,710,091	704,107
Midland Valley.....	373	278,984	120,433	2,466,978	2,645,411	339,429	338,523	7,412	867,263	1,155,996	.....	97,444	713,480	20,267
Minneapolis & St. Louis.....	1,586	1,724,945	595,195	2,466,978	2,645,411	339,429	338,523	52,127	867,263	1,155,996	.....	16,500	47,073	54,740
Missouri & North Arkansas.....	365	202,400	127,764	348,933	78,997	78,997	53,716	10,570	125,255	285,360	.....	514	1,396,721	119,152
Missouri, Okla. & Gulf Ry. Co. of Texas.....	19	22,913	1,600	24,930	2,747	2,747	5,954	192,502	2,943,846	5,938,561	.....	280,170	73,426	3,332
Missouri Pacific.....	3,920	5,614,000	1,414,092	7,628,142	11,671,166	1,167,166	628,815	114,580	1,173,424	2,401,003	.....	98,434	231,327	26,613
Mobile & Ohio.....	1,122	2,599,572	403,652	3,176,358	389,584	389,584	24,281	1,068	7,671	164,320	.....	7,050	21,327	26,613
Monongahela.....	67	388,020	8,792	402,697	55,821	55,821	24,281	1,068	7,671	164,320	.....	16,500	47,073	54,740
Monongahela Connecting.....	6	2,072,300	851,091	273,615	3,197,006	36,710	51,561	900	125,645	222,507	.....	7,691	51,108	49,182
Nashville, Chattanooga & St. Louis.....	1,231	2,072,300	851,091	273,615	3,197,006	36,710	51,561	900	125,645	222,507	.....	7,691	51,108	49,182
Nevada Northern.....	165	389,252	42,982	432,928	52,521	52,521	2,764	126,975	1,185,341	1,292,316	.....	13,274	221,717	17,473
New Orleans & North Eastern.....	196	786,194	172,381	1,027,489	108,783	108,783	206,830	30,612	385,048	260,207	.....	647	47,400	63,648
New Orleans Great Northern.....	283	335,479	106,205	478,669	66,362	66,362	43,860	10,928	175,376	337,492	.....	20,071	186,487	22,603
New Orleans, Mobile & Chicago.....	403	409,586	101,504	544,394	75,389	75,389	53,688	10,928	175,376	337,492	.....	20,071	186,487	22,603
New York, New Haven & Hartford.....	2,093	8,371,090	7,925,769	17,936,727	2,379,214	2,379,214	2,397,861	142,311	6,670,928	12,027,130	.....	6,640	49,267	144,377
New York, Susquehanna & Western.....	154	496,646	159,851	738,047	122,355	122,355	97,413	5,918	299,835	550,443	.....	24,922	2,436,037	462,472
Norfolk & Western.....	2,035	9,989,248	1,430,255	11,839,884	1,552,737	1,552,737	2,341,551	171,299	3,619,401	12,681,443	.....	6,053	3,555,194	203,602
Norfolk Southern.....	472	2,539,806	755,219	3,510,508	481,759	481,759	753,158	55,081	1,617,621	2,993,999	.....	2,702	393,720	191,009
Northern Central.....	6,312	12,977,574	5,051,209	19,242,713	3,241,567	3,241,567	2,246,330	340,028	5,826,556	11,907,526	.....	344	1,069,485	6,414,302
Northern Pacific.....	401	453,160	1,321,750	4,324,976	824,803	824,803	852,407	100,471	1,782,387	3,682,437	.....	15,355	477,274	584,055
Northwestern Pacific.....	2,023	4,122,202	1,326,983	6,003,654	786,707	786,707	1,029,266	125,777	1,371,324	2,832,340	.....	227	2,436,037	462,472
Oregon Short Line.....	1,751	13,962,040	3,012,665	18,624,176	2,439,752	2,439,752	3,233,515	276,557	6,402,460	14,267,263	.....	26,669	755,772	603,629
Pennsylvania Co.....	4,032	34,662,353	10,957,954	48,824,488	6,080,405	6,080,405	9,668,581	713,044	16,973,417	34,557,225	.....	429,332	1,987,303	143,002
Pennsylvania Railroad.....	352	617,884	202,816	897,277	135,576	135,576	227,380	15,376	335,883	731,787	.....	31,200	134,290	149,328
Peoria & Eastern.....	282	502,586	35,576	545,572	145,335	145,335	142,769	4,594	100,463	498,132	.....	19,375	477,274	584,055
Pere Marquette.....	2,325	2,586,563	1,321,750	4,324,976	824,803	824,803	852,407	100,471	1,782,387	3,682,437	.....	15,355	477,274	584,055
Philadelphia, Baltimore & Washington.....	713	2,777,615	2,240,513	5,118,684	916,068	916,068	1,029,266	125,777	1,371,324	2,832,340	.....	227	2,436,037	462,472
Pittsburgh, Lake Erie.....	223	4,477,703	555,334	5,118,684	916,068	916,068	1,029,266	125,777	1,371,324	2,832,340	.....	227	2,436,037	462,472
Pittsburgh, Cincinnati, Chic. & St. Louis.....	1,472	8,055,345	2,575,728	11,865,253	1,806,253	1,806,253	2,313,752	224,070	4,365,412	7,321,412	.....	82	3,556,472	321,342
Pittsburgh, Shawmut & Northern.....	88	346,239	234,784	603,583	80,444	80,444	79,882	10,029	251,062	442,210	.....	18,763	61,464	14,058
Richmond, Fredericksburg & Potomac.....	468	509,709	419,659	1,072,679	90,307	90,307	60,424	15,082	172,645	357,370	.....	362,282	3,556,472	321,342
Rutland.....	319	303,176	99,659	433,679	114,406	114,406	142,769	4,594	100,463	498,132	.....	19,375	477,274	584,055
St. Joseph & Grand Island.....	4,742	7,651,383	3,037,767	11,440,166	1,588,706	1,588,706	2,195,553	219,553	3,625,238	7,321,412	.....	82	3,556,472	321,342
St. Louis & San Francisco.....	518	371,804	238,002	673,357	104,382	104,382	72,087	13,953	223,236	444,516	.....	16,500	212,341	62,856
St. Louis, Brownsville & Mexico.....	3,365	6,074,997	1,655,530	8,238,738	1,187,676	1,187,676	1,469,107	164,514	2,546,311	2,713,664	.....	11,065	2,410,744	154,138
St. Louis, Iron Mountain & Southern.....	244	290,550	105,303	420,398	71,186	71,186	47,748	7,504	143,131	286,161	.....	90,696	754,518	24,656
St. Louis, San Francisco & Texas.....	906	1,562,799	395,211	2,072,719	200,825	200,825	376,878	81,836	485,857	1,222,984	.....	36,000	463,072	97,595
St. Louis Southwestern.....	724	969,746	432,081	1,476,151	219,524	219,524	205,207	18,352	494,121	971,079	.....	4,119	1,305,628	160,472
San Antonio & Aransas Pass.....	3,082	3,611,977	1,300,959	5,494,952	685,107	685,107	772,420	191,043	2,119,163	3,939,205	.....	246,000	1,305,628	160,472
Seaboard.....	281	147,220	96,663	266,410	39,591	39,591	32,858	6,871	125,984	253,226	.....	13,184	12,229	52,642
Southern in Mississippi.....	179	244,789	52,115	313,080	39,591	39,591	53,199	9,782	97,812	105,470	.....	12,736	93,049	24,198
Southern Kansas of Texas.....	294	291,851	127,714	443,019	85,269	85,269	38,623	17,366	145,916	308,943	.....	1,851	400,984	3,163
Tennessee Central.....	443	1,453,726	204,033	1,764,365	300,134	300,134	312,979	22,776	636,072	1,301,799	.....	462,566	34,240	135,077
Toledo & Ohio Central.....	248	199,372	145,465	364,738	86,874	86,874	78,478	7,504	143,131	286,161	.....	46,000	384,266	99,206
Toledo, Peoria & Western.....	451	1,013,111	123,305	1,208,738	127,583	127,583	169,103	408,196	26,349	430,266	.....	14,995	24,525	9,216
Trinity & Brazos Valley.....	463	424,005	163,210	609,421	156,063	156,063	105,319	31,951	290,727	618,951	.....	34,891	17,553	364,647
Union Railroad of Baltimore.....	31	362,961	73,715	441,155	30,822	30,822	298,474	3,913	509,517	58,955	.....	382,200	31,000	443,566
Union Railroad of Pennsylvania.....	171	116,576	155,886	437,793	78,734	78,734	42,067	10,427	149,991	340,501	.....	9,721	31,000	443,566
Vicksburg, Shreveport & Pacific.....	36	106,541	116,576	299,217	42,067	42,067	42,157	3,779	122,417	79,650	.....	548	73,685	5,216
Washington Southern.....	356	512,694	1,861,249	2,510,983	323,969	323,969	331,596	57,977	811,757	1,565,807	.....	82,212	850,666	103,546
West Jersey & Seashore.....	133	178,848	138,325	343,702	63,485	63,485	74,214	17,461	98,567	270,271	.....	173	51,115	59,089
Western Ry. of Alabama.....	459	2,064,868	204,280	2,379,063	475,142	475,142	436,258	25,663	709,171	1,698,839	.....	513	581,990	202,063
Wheeling & Lake Erie.....	1,372	1,839,849	675,293	2,704,093	503,172	503,172	503,172	47,417	1,053,529	2,185,627	.....	129,000	386,432	207,342
Yazoo & Mississippi Valley.....	1,372	1,839,849	675,293	2,704,093	503,172	503,172	503,172	47,417	1,053,529	2,185,627	.....	129,000	386,432	207,342

STATE COMMISSIONS.

The Minneapolis & Rainy River has filed with the Minnesota Railroad and Warehouse Commission a petition asking to be allowed to advance its freight rates 20 per cent. above the state rates, on the ground that the latter, as applied to this road, are confiscatory.

Richard Yates, formerly governor of Illinois, has been appointed a member of the Illinois Railroad and Warehouse Commission, succeeding B. A. Eckhart, with the understanding that he is to be appointed later a member of the new public utilities commission, which will succeed the present commission on January 1.

The Railroad Commission of Louisiana has announced a hearing on November 19 on a proposed order prescribing a maximum passenger fare of $2\frac{1}{2}$ cents a mile for railways over 50 miles in length, and varying rates for shorter roads. The commission will also take up at the hearing the entire question of passenger fares, including a proposed rule permitting carriers to collect one cent a mile additional up to 50 miles when a passenger fails to provide himself with a ticket at a station where tickets are on sale.

The Illinois Railroad and Warehouse Commission held a hearing on November 6 on tariffs filed by the railways for a 5 per cent. advance in intrastate freight rates to correspond with the interstate rates filed with the Interstate Commerce Commission. Chairman Berry, of the commission, announced that the tariffs would be suspended for the same period of suspension as decided on by the federal commission, and if that body failed to suspend the interstate rates the Illinois commission would suspend the Illinois rates for 60 days, pending an inquiry.

COURT NEWS.

The Supreme Court of the United States, in the case of Oliver Letot, a Texas farmer, has sustained the law of that state making railroads responsible for damage if they permit weeds to grow on their right of way and the seeds blow into adjoining farms and damage the land.

The Supreme Court of the United States, in a case against the Missouri, Kansas & Texas, has sustained the Federal hours-of-service law under which the ordinary limit for trainmen is 16 hours; and it is declared that a company is liable for a penalty in the case of each individual trainman who is required to work longer than the law allows.

Low Lemon Rates Sustained.

The decision of the Supreme Court of the United States in the case involving freight rates on lemons from California eastward, briefly announced last week, was not accompanied by a written opinion. The court announced that the decree of the lower court, sustaining the order of the commission reducing rates, was affirmed on the authority of the case of the Illinois Central against the commission (206 U. S., 454); Chicago, Rock Island & Pacific v. Commission (218 U. S., 88, 110); Proctor & Gamble case (225 U. S., 282, 297-298), and Louisville & Nashville case (227 U. S., 88, 91).

The salient point is that questions of the reasonableness of rates involving only facts are for the interstate commerce commission to pass upon and not for the courts to review.

The California lemon growers secured an increase in the import duty on lemons, in the Aldrich law of 1909, on the assertion that they could not otherwise continue to compete with foreign lemons. The transcontinental railways quickly raised their rates to eastern points from \$1 to \$1.15 to absorb this difference.

The commission thereupon issued an order requiring the railways to put their rates back to \$1. On appeal to the Commerce Court, that tribunal, in October, 1911, reversed the commission, holding that it was not within the province of that body to protect the lemon industry of California against foreign competition.

In December of the same year the commission reaffirmed its previous order, upset by the Commerce Court (leaving out reference to import duties) and reduced rates on California lemons to all points in the United States from \$1.15 per 100 lbs. to \$1; and ordered the carriers to make effective the lower rate on February 15, 1912. The appeal of the roads against this order is now dismissed.

Railway Officers.

Executive, Financial and Legal Officers.

A. M. Lee has been appointed assistant general claim agent of the Northern Pacific, with headquarters at Seattle, Wash.

Denegre, Leovy & Chaffe, of New Orleans, La., have been appointed general attorneys of Morgan's Louisiana & Texas Railroad & Steamship Company, the Louisiana Western and the Iberia & Vermilion, subsidiary lines of the Southern Pacific.

W. C. Nixon, receiver and chief executive officer of the St. Louis & San Francisco, with office at St. Louis, has been elected president. W. F. Hull has been elected assistant secretary, succeeding T. D. Heed, who resigned recently to remain with the Chicago & Eastern Illinois.

Operating Officers.

George J. Shreeve, trainmaster of the Belt Railway of Chicago, has been appointed superintendent, with headquarters at Chicago.

Edward Bodamer has been appointed trainmaster of the Illinois Central at Fulton, Ky., in place of G. E. Gallaway, who has been granted a leave of absence.

B. A. Porter, trainmaster of the Yazoo & Mississippi Valley at Memphis, Tenn., has been appointed superintendent of the Memphis division, with headquarters at Memphis, Tenn., succeeding P. Laden, resigned.

W. G. Curran has been appointed assistant general superintendent of transportation of the Baltimore & Ohio Southwestern and the Cincinnati, Hamilton & Dayton, with headquarters at Cincinnati, Ohio.

F. D. Kelsey, division superintendent of the Great Northern at Breckenridge, Minn., has been appointed superintendent of the Butte division, with headquarters at Great Falls, Mont., succeeding P. C. Allen, resigned.

Charles E. Brooks has been appointed acting superintendent of the Montana division of the Oregon Short Line, with headquarters at Pocatello, Idaho, in place of C. F. Smith, granted leave of absence on account of ill health.

M. H. Cahill, assistant superintendent of the Cumberland division of the Baltimore & Ohio, at Keyser, W. Va., has been promoted to superintendent of the New Castle division, with headquarters at New Castle Junction, Pa., succeeding H. H. Temple, resigned.

J. D. Stack, who recently resigned as division superintendent of the Oregon-Washington Railroad & Navigation Company, has been appointed assistant superintendent of the Toledo division of the Cincinnati, Hamilton & Dayton, with headquarters at Dayton, Ohio.

I. H. Luke, superintendent of the Second division of the Denver & Rio Grande, has been transferred to Salt Lake City, Utah, as superintendent of the Salt Lake division, succeeding N. A. Williams, who has been appointed superintendent of the Green River division, with headquarters at Helper, Utah, in place of J. T. Slattery. The latter takes the place of Mr. Luke at Salida, Colo.

W. C. Nixon, receiver and chief operating officer of the St. Louis & San Francisco, announces that, effective November 15, A. S. Greig, in addition to his duties as assistant to the receivers, will be first assistant to the chief operating officer, and B. T. Wood will be second assistant. The office of assistant to chief operating officer (mechanical) will be abolished, and W. H. V. Rosing will be assigned to duty under the general superintendent of motive power. The testing department will be in charge of the latter officer also.

Traffic Officers.

Ben R. Grove has been appointed traveling passenger agent of the Louisville & Nashville, with headquarters at Indianapolis, Ind.

W. R. Flounders, Jr., has been appointed freight solicitor of the Pennsylvania Railroad, with office at New York, succeeding E. J. Karr, promoted.

W. R. Smith, division freight agent of the Sunset-Central Lines of the Southern Pacific at Galveston, Tex., has been transferred to Austin, Tex. A. J. Morris succeeds Mr. Smith.

Henry Blakeley, general western freight agent of the Northern Pacific at Tacoma, Wash., has been appointed general freight agent, with headquarters at St. Paul, Minn., effective December 1, succeeding J. B. Baird, promoted.

Bennett Maass, commercial agent of the Macon, Dublin & Savannah, at Savannah, Ga., has been appointed contracting freight agent, with office at Macon, and his former position has been abolished. W. M. Coble, soliciting agent at Jacksonville, Fla., has been promoted to traveling freight agent, and his former position has been abolished.

Engineering and Rolling Stock Officers.

W. H. Rupp has been appointed chief engineer of the Sumpter Valley, with office at Baker, Oregon.

Gus Blaser has been appointed roadmaster of the Oregon Short Line at Kemmerer, Wyo., in place of J. J. Daily, resigned.

A. B. McDonald, general car foreman of the Intercolonial Railway at Moncton, N. B., has been appointed superintendent of car shops at Moncton.

J. Clifford has been appointed assistant engineer maintenance of way of the Canadian Pacific Western Lines, with headquarters at Winnipeg, Man.

S. M. Bate has been appointed division engineer of the New Orleans, Texas & Mexico and the Beaumont, Sour Lake & Western, with headquarters at De Quincy, La.

The jurisdiction of J. F. Enright, superintendent of the motive power and car department of the Denver & Rio Grande, with headquarters at Denver, Colo., has been extended over the Western Pacific.

H. B. Hayes, master mechanic of the Alabama Great Southern at Birmingham, Ala., has been appointed master mechanic of the Cincinnati, New Orleans & Texas Pacific at Somerset, Ky., succeeding Joseph Quigley, resigned.

Purchasing Officers.

F. C. Turner has been appointed division storekeeper of the Northern Pacific at Pasco, Wash., in place of J. C. Vollmer, resigned.

F. E. Connors, assistant general purchasing agent of the Atchison, Topeka & Santa Fe, at Chicago, has been appointed assistant to vice-president in charge of stores, with headquarters at Topeka, Kan., and E. A. Clifford has been appointed assistant general purchasing agent, with office at Chicago, succeeding Mr. Connors.

N. M. Rice, general storekeeper of the Atchison, Topeka & Santa Fe at Topeka, Kan., has been appointed chief purchasing officer of the St. Louis & San Francisco, with headquarters at St. Louis, Mo. Mr. Rice will be in charge of purchases and stores, and will have supervision and care of all material, fuel, supplies and stationery in the possession of the receivers. Effective November 15.

OBITUARY.

Charles H. Smith, traveling freight agent of the Chicago, Indiana & Southern, with headquarters at Minneapolis, Minn., died on November 4, aged 58 years.

Matthew J. Ramsey, chief clerk to the general manager of the Pennsylvania Railroad, died on November 9, at his home in Overbrook, Pa. He was born in Newark, Del., on April 1, 1849, and began railway work as a telegraph operator at Perklemen Junction on the Philadelphia & Reading in 1866. Five years later he entered the service of the Pennsylvania Railroad as a telegraph operator at Pier No. 2, New York City. He was transferred to Philadelphia, the following year, and in July, 1874, was appointed telegraph operator in the general manager's department. He served as a telegraph operator, and later as a clerk until February 10, 1897, and since that time had been chief clerk of the general manager's department.

Equipment and Supplies.

LOCOMOTIVE BUILDING.

THE PITTSBURGH, SHAWMUT & NORTHERN has ordered 1 mogul locomotive from the Baldwin Locomotive Works.

THE LEHIGH & NEW ENGLAND is said to be in the market for 5 consolidation locomotives and 3 switching locomotives. This item has not been confirmed.

CAR BUILDING.

THE WARASH is in the market for 500 box cars.

THE CHICAGO GREAT WESTERN is in the market for 1,500 steel underframes.

IRON AND STEEL.

THE BALTIMORE & OHIO has ordered 2,500 tons of structural steel from the American Bridge Company.

GENERAL CONDITIONS IN STEEL.—There is very little change in steel conditions. It is a waiting market. On the one hand, producers are not inclined to lower prices, on the ground that such a movement would induce no buying. Consumers are indifferent. They say that their own business has fallen off and they are in no hurry to buy large quantities of steel for future delivery. Independent manufacturers report that orders are not running in excess of 25 per cent. of capacity. The railroads show no disposition to buy, and no large rail orders are expected before the close of the year. Buying of railroad companies will be restricted until a decision is reached by the Interstate Commerce Commission relative to freight rates.

SIGNALING.

The Chicago, Burlington & Quincy has contracted with the Federal Signal Company for the installation of automatic block signals on 112 miles of road between Denver, Col., and Akron, single track. Federal style "4" top-post signals will be used.

The Alexandria & Western has given a contract to the Federal Signal Company for an interlocking plant at the crossing of the Texas & Pacific at Alexandria, La. The distant signals will be the Federal Signal Company's Type 4, power operated.

The Federal Signal Company has been awarded a contract for new interlocking at the crossing of the Burlington County Transit Railway, with the Burlington branch of the Pennsylvania, at Mount Holly, N. J. Federal style "4" top-post distant signals will be used.

The Canadian Government has given to the Union Switch & Signal Company, a contract for automatic block signals on the Intercolonial Railway, amounting to about \$85,000. The lines to be signaled are those from St. John to Hampton, 22 miles; Moncton to Painsec Junction, 7 miles, and Windsor Junction to Halifax, 14 miles.

REFRIGERATOR CARS.—According to a German paper devoted to the cold storage business there are in North America 100,000 refrigerator cars in service, besides 50,000 insulated and provided with special ventilating equipment. In the whole of Europe there are only 50,000 refrigerator cars of which 3,000 are on the Russian railways.

NEW LINE FOR INDIA.—The Southern Shan states branch line, Burma railways, is now open to Kywedatsin, 16 miles from Thazi, and trains will now run up to Yinmabin station, 7 miles further. It is intended eventually to construct the line to Yapghwe, one of the largest trading towns of the Southern Shan States, 116 miles from Thazi, and when that is completed it is considered that it will mark the beginning of a new era in the development of the Southern Shan States.

Supply Trade News.

E. E. Hudson, sales manager of the Primary Battery department of Thomas A. Edison, Inc., Orange, N. J., has been made fourth vice-president of that company. Mr. Hudson will continue as heretofore in charge of the sales of the Primary Battery department, with headquarters at Orange, N. J. Mr. Hudson entered the signal supply business in July, 1898, with the Edison Manufacturing Company, as chief clerk in the Primary Battery department. He remained with that company until June, 1902, when he left to become treasurer of the Peerless Fashion Company. After a few months he resigned that position and went to the United States Steel Corporation as accountant in the comptroller's department. This position he retained until December, 1903, when he was made secretary and treasurer of the Battery Supplies Company, Newark, N. J. In 1905 he was made also sales manager of that company. In 1908 he returned to the Edison company upon the absorption of the Battery Supplies Company, as assistant manager of sales in the Primary Battery department. He was made manager of sales of that department in February, 1909, which position he retained until his election as fourth vice-president of the company, as mentioned above.



E. E. Hudson.

TRADE PUBLICATIONS.

SIDE-BLOW STEEL CONVERTER.—The Whiting Foundry Equipment Company, Harvey, Ill., has issued catalog 106, dealing with the Whiting side-blow steel converter. This booklet contains 16 pages, is attractively gotten up and illustrated.

AIR PUMP UNIONS.—The National Tube Company, Pittsburgh, Pa., has recently issued a folder dealing with the Kewanee air pump union. This type of the Kewanee union is largely used on the air lines of locomotives. The subject is presented in the form of a probable conversation between a salesman and a prospective user, and offers considerable valuable information.

ELECTRIC DRILLS.—The Independent Pneumatic Tool Company, Chicago, has issued a circular describing two Thor electric drills which are recent additions to that line and which will be sent to any responsible person for ten days' test to ascertain their merit and adaptability. The principal feature is the fact that they are equipped with a universal motor so that the machine may be attached to the ordinary incandescent lamp socket of 110 or 220 volts, direct or alternating current, 60 cycles or less and single phase. This is claimed to be the only combination roller and ball bearing electric drill on the market. It is capable of drilling holes up to 5/16 in. diameter.

AUTOMATIC TRAIN CONTROL.—The Detroit automatic train control system is described and the apparatus illustrated in a 30-page booklet recently issued from Detroit. This system is an improvement upon the Prentice wireless scheme. It provides for signals both visual and audible in the engineer's cab and in the train despatcher's office, and enables the despatcher to produce a caution or danger signal at any point. The response to any danger or caution signal takes place mechanically and independently of the engineer, the high-frequency currents flowing in "wayside" circuits parallel to the track operating on two receiving circuits on the engine, and these in turn on the steam and air. The wayside circuits may be arranged to reduce the speed of the train at any point.

Railway Construction.

ALABAMA & MISSISSIPPI.—An officer writes that this company, which operates a line from Vinegar Bend, Ala., southwest to Leakesville, Miss., is building a 12 mile extension in Mississippi. Contractor Houston is doing the grading work and the company is carrying out the track laying with its own forces.

ALGOMA CENTRAL & HUDSON BAY RY.—The Northern division has been opened for business from Franz, Ont., north to Oba, 50 miles.

ALGOMA EASTERN.—This road has been extended from Espanola, Ont., west to Turner (Little Current), 37 miles.

CANADIAN ALBERTA.—The Canadian parliament has been asked to incorporate this company to build a railway from the Canadian Pacific about a mile west of Blairmore, Alta., thence northerly and westerly through townships 8 and 9, range 4, west of the 5th meridian, to section 20 in township 9, about 14 miles. Taylor, Harvey, Grant, Stockton & Smith, Vancouver, B. C., are acting for the applicants.

CANADIAN PACIFIC.—On the Alberta division the Lemsford sub-division has been extended from Cabri, Sask., north to Prussia, 53.7 miles. The Coronation sub-division has been opened for business from Coronation, Alta., east to Monitor, 41.8 miles, and on the Saskatchewan division the Neptune sub-division has been opened for business from Hooper, Sask., west to Neptune, 53.8 miles.

The West Ontario Pacific has asked for an extension of time to build from a point on the main line at or near London, Ont., northerly through the counties of Middlesex or Oxford, Perth, Huron and Bruce to a point on Lake Huron in the county of Bruce.

CENTRAL CANADA.—The Canadian parliament has been asked to incorporate this company to build railway lines from Winnipeg, Man., in a generally northwestern direction via Yorkton, Saskatoon and Battleford, Sask., to Edmonton, Alb. Pringle & Guthrie, Ottawa, Ont., are solicitors for applicants.

CHARLESTON NORTHERN.—This company has applied for a charter in South Carolina, with headquarters at Darlington. The plans call for building through the counties of Georgetown, Berkeley and Charleston, from a point on the Georgetown & Western in Black River township, to Charleston, about 57 miles. D. T. McKeithan and D. Williamson, Darlington, and J. D. Evans, Florence, are interested.

CHICAGO, MILWAUKEE & ST. PAUL.—Work on the line from Great Falls, Mont., southeast to Lewistown 137 miles, it is understood will be finished this year. Track has been laid on 38 miles between Lewistown and Denton on the eastern end and from Great Falls east on 22 miles. Contracts were let last year to Winston Bros., Minneapolis, Minn., and to Twohy Brothers, Portland, Oregon, to build the line.

According to press reports Guthrie, McDougall & Company, Portland, Oregon, was recently given a contract for building the Puget Sound & Willapa Harbor from Maytown, Wash., to Doty, and has sub-let to Martin E. Johnson, Portland, the section from Maytown to Chehalis. Guthrie, McDougall & Company will carry out the work between Chehalis and Doty. The Keasel Construction Company is building towards Doty from Raymond. (October 10, p. 679.)

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—This company has completed work on 17.5 miles of new second main track between Erlanger, Ky., and Crittenden, and it was recently put in service. The company now has a total of 106 miles of double track in operation between Cincinnati, Ohio, and Chattanooga, Tenn. Vice-president T. C. Powell announces that work is rapidly progressing on the remainder of this work on a section of about 12.5 miles, which will complete the double track to a point just below Williamstown, Ky., a distance of 38 miles from Cincinnati. (May 23, p. 1161.)

CLEAR LAKE.—This company has been authorized to issue \$500,000 bonds and \$261,700 stock under various conditions, in order to build a 23½ mile line from Hopeland, Mendocino county, Cal., northeast to Lakeport. Work was started on the

line last year. C. M. Hammond, president, Lakeport; C. R. Rankin, chief engineer, Hopeland.

GOLDSBORO, SEVEN SPRINGS & SWANSBORO.—An officer of this company, which was incorporated in 1911, in North Carolina, with \$1,500,000 capital, writes that the company has not yet decided when the contract will be let to build the line. The projected route is from Goldsboro, N. C., southeast via Seven Springs, Pink Hill, Richlands and Jacksonville to Swansboro, about 70 miles. It is understood that several of the towns along the route have recently arranged to issue bonds, and the proceeds are to be used to help build the line. T. H. Pritchard, president, Swansboro.

GRAND TRUNK.—The Lachine, Jacques Cartier & Maisonneuve has asked for an extension of time to build lines from Lachine, Que., to a point in the Hochelaga ward, Montreal, or in Maisonneuve, passing in the rear of Mount Royal, Montreal, with extensions from the starting point to Dorval and to the northern end of Montreal Island.

GRAND TRUNK PACIFIC.—The Mountain division has been extended from Moricetown, B. C., west to Rose Lake, 95.7 miles.

GULF FLORIDA & ALABAMA.—The main line has been extended from Local, Ala., north to Broughton, 21 miles.

LACHINE, JACQUES CARTIER & MAISONNEUVE.—See Grand Trunk.

MIDLAND CONTINENTAL.—Train service is now in operation between Edgeley, N. D., and Wimbledon, 76 miles.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—The Cuyuna line of the Duluth-Superior division has been extended from Crosby, N. D., to Riverton, 4.5 miles.

MINNEAPOLIS UNION ELECTRIC.—This company will ask for incorporation in South Dakota with a capital of \$2,000,000, to build from Minneapolis, Minn., northwest to St. Cloud, about 70 miles. The incorporators include A. Poulip, E. G. Garwood and P. A. Chadwick, of Minneapolis, Minn., and E. M. Lawrence, of Huron, S. D.

NEW YORK NEW HAVEN & HARTFORD.—The report of this company for the year ended June 30, 1913, shows that construction work on the New York Connecting Railroad has now reached a point where modification of the tracks of the Harlem River branch of the New Haven will soon be necessary, and the work will probably be carried out this year. At Westchester yard new receiving tracks have been put in. Work has been finished on the Hawleyville-Shelton double tracking, providing a double track line from Naugatuck Junction to Hopewell Junction, 68.44 miles. The Berkshire Junction-New Milford double tracking has been finished from Berkshire Junction to Brookfield Junction, the work involving the elimination of four grade crossings by building two overhead bridges, also line changes at Brookfield and at Still River. A new railroad bridge is included at Still River, also a new station at Brookfield, and the present station at Still River will be remodeled and relocated, it is expected that this work will be finished before the close of 1913. The excavation for change of alignment in connection with the proposed New Haven station has been completed, and the lowering of the tracks in the west cut to obtain sufficient overhead clearance for electrification involving the underpinning of existing walls and piers and installation of new highway bridges at Cedar, Lamberton, Dewitt streets and Howard avenue will be finished during 1913. The enlargements and extensive changes in the Cedar Hill freight yards have been completed and the total yard capacity has been increased to 1,511 cars. On the Air Line Improvement the filling of Lyman viaduct to obtain a double track roadbed has been continued during the year, and is about 60 per cent. completed, it will probably be finished before the close of 1913. The Rapallo viaduct filling will also be finished during the ensuing year. The revision and improvement of facilities at Westerly, R. I., consisting of new passenger and freight stations, revision of alignment and provision for future four-tracking, a new freight yard, additional passing sidings, passenger subway, three new bridges and the elimination of one grade crossing are about finished. The construction of double track on sections of the line between Providence, R. I., and Fall River, with line and grade revision, and elimination of grade crossings has been com-

pleted, also the double tracking East Providence to East Junction. All the work at Worcester, Mass., including the elimination of grade crossings, a new coach yard and engine facilities, connection between the Norwich & Worcester and the Providence & Worcester is finished except some minor details of signals and interlocking. The crossing at grade of the tracks of the Boston & Albany and the New Haven has been abolished, and the B. & A. tracks now pass over the New Haven tracks on a steel viaduct. The company has undertaken the elimination of five grade crossings in Pawtucket and Central Falls on a revised alignment. The plans include reconstruction of freight yards, a new passenger station over the tracks to serve both cities, eight overhead highway bridges, a foot-bridge, also third and fourth tracks. This work is expected to be finished early in 1915. Surveys for third and fourth tracks and elimination of grade crossings are about finished from East Junction to Readville, and hearings are being held on the 13 proposed crossing eliminations in the towns of Westwood, Canton, Foxboro, Sharon and Mansfield. The electrification of the Oak Point and Westchester yards has been completed. The Harlem River yard electrification is about finished, and it is expected that the Van Nest yard will be completed in a few months. The work of electrifying the main line from Stamford to New Haven is under way, and this work may be sufficiently advanced to permit electric operation between Stamford and New Haven early in 1914. The construction of the New York connecting is proceeding actively. The contracts already let cover the section from a connection with the New York, New Haven & Hartford, in the borough of the Bronx to a connection with the New York Tunnel extension of the Pennsylvania Railroad in the borough of Queens, 4.64 miles. This section includes a large bridge over the East river; the bridges across Little Hell Gate and the Bronx Kills and the viaducts across Ward's and Randall's islands. The remaining section of the road, consisting of the main line between Bowery Bay Road and Fresh Pond Junction, where connection will be made with the Long Island Railroad in the borough of Queens, 4.32 miles, will not be placed under contract until next year. This line is being built jointly by the New Haven and the Pennsylvania Railroad.

NEW YORK SUBWAYS.—The New York Public Service Commission, First district, has approved the form of contract for the construction of section No. 6 of routes Nos. 4 and 38, of the Seventh avenue subway, in the borough of Manhattan. This section covers that portion of the subway under Seventh avenue, between Thirtieth and Forty-second streets. This line is being built with money contributed by the Interborough Rapid Transit Company, and the form of contract was sent to that company for approval.

ONEIDA & WESTERN.—A contract has been given to A. M. Cook, Oneida, Tenn., it is said, to build from Oneida west about 30 miles. There will be a number of steel bridges on the line. R. J. Moncort, chief engineer, Oneida. (October 31, p. 844.)

ONTARIO LAKE FRONT TERMINAL.—The Canadian parliament has been asked to incorporate this company to build from a point on the Canadian Pacific between Havelock, Ont., and Central Ontario Junction, southeasterly via Campbellford, to Cobourg, and from Campbellford southerly to Brighton. C. Pringle, Ottawa, Ont., is solicitor for applicants.

OREGON SHORT LINE.—The Idaho Northern branch of the Idaho division has been extended from Montour, Idaho, northeast to Smith's Ferry, 42 miles.

PACIFIC, PEACE RIVER & ATHABASCA.—Application is being made to the Canadian parliament for incorporation to build from tide-water at the mouth of the Naas river in British Columbia east to Prince Albert, Sask., about 1,500 miles. The plans call for building along the Naas river, Courier creek, the Skeena river, and Bear river to Bear lake; thence down to Driftwood river to North Tacla lake, and via Hogam pass to the Omineca river; thence to the Findlay branch of the Peace river, and along the north side of the main Peace river to Vermillion Rapids or Chutes in Alberta, and crossing the river at the falls; thence down the right bank of the Peace river to Point Providence; thence to the Athabasca river and along that river to Fort McMurray; then following the Clearwater river and the Pembina river south to the height of land, crossing over to Buffalo river, and then

easterly and southerly to Prince Albert, Sask. Pringle, Thompson, Burgess & Cote, Ottawa, Ont., are solicitors for applicants.

PENNSYLVANIA RAILROAD.—We are told that this company has entered into an agreement with the city officers of Philadelphia, Pa., for the removal of the tracks on Lehigh avenue in Philadelphia.

PITTSBURGH, SHAWMUT & NORTHERN.—The main line has been extended from Mahoning, Pa., to Kittanning, 11 miles.

PUGET SOUND & WILLAPA HARBOR.—See Chicago, Milwaukee & St. Paul.

RALEIGH, CHARLOTTE & SOUTHERN.—The main line has been extended from Mt. Gilead, N. C., south to Aquadale, 14 miles.

SALINA CANYON.—This company has been organized in Utah with \$1,000,000 capital to build a 35-mile line from Salina, Utah, east through Salina canyon. Right of way has been secured; the line will have a 4 per cent. grade. J. Pingree, president, Ogden; E. P. Ellison, vice-president, Layton; O. C. Beebe, treasurer, and G. S. Spencer, secretary, Salt Lake City.

SAN ANTONIO, FREDERICKSBURG & NORTHERN.—We are told that this company on October 31, opened the line for freight and passenger traffic from Fredericksburg Junction, Tex., where a connection is made with the San Antonio & Aransas Pass, north via Nichols, Hillington and Mt. Alamo to Fredericksburg, 23.8 miles. (September 12, p. 479.)

WATERLOO, CEDAR FALLS & NORTHERN. (Electric).—The Waterloo & La Porte City line has been extended from La Porte City, Iowa, to Brandon, 10 miles.

WEST ONTARIO PACIFIC.—See Canadian Pacific.

RAILWAY STRUCTURES.

BALTIMORE, MD.—Contracts have been given by the Baltimore & Ohio to the McLean Construction Company, Baltimore, for enlarging open Pier 5, in the Locust Point terminal, at Baltimore. The new pier will cost \$100,000, and, under the contract, will be completed in three months.

DUNCAN, N. C.—See Norwood.

MAGNOLIA, W. VA.—The Baltimore & Ohio will build two bridges on the new Magnolia cut-off. One at Magnolia, W. Va., and the other at Kessler's Curve. A contract has been given to the American Bridge Company for 2,500 tons of structural steel for the bridges.

MARSHALL, TEX.—The Texas & Pacific has let a contract for the construction of a 20-stall roundhouse.

NORWOOD, N. C.—An officer of the Norfolk Southern writes that contracts have been given to C. V. York, Raleigh, N. C., for putting up new stations at Norwood and at Duncan.

OMAHA, NEB.—The Chicago & North Western has announced that a new inbound freight house and office building for the general western headquarters of the company, will be erected at this point at a cost of approximately \$350,000.

TULSA, OKLA.—The St. Louis & San Francisco has announced plans for a new passenger station.

VAN NEST, N. Y.—The report of the New York, New Haven & Hartford for the year ended June 30, 1913, shows that a new repair shop, inspection shed, and blacksmith shop were completed at Van Nest, and at Oak Point a new office building, storehouse and inspection pits were also completed. At Westchester yard three 1,200-ft. freight transfer platforms and an office building have been put up, and at Pelham Bay the filling of the six-track timber trestle approach to the lift bridge is progressing. Work is nearing completion on an extension of the power plant at Cos Cob. At Ansonia, the four span reinforced concrete bridge over the Naugatuck river and the elimination of Bridge street grade crossing has been completed. Construction work is under way at Readville, Mass., on a 200-ft. extension of the locomotive shop, and at Clinton improvements are under way including the elimination of four highway and one railroad grade crossing. During the year the company replaced a number of the bridges with larger and heavier structures, and also put up a number of station buildings at various places and improved the facilities at others.

Railway Financial News.

FT. DODGE, DES MOINES & SOUTHERN.—This property was purchased at foreclosure sale for \$3,900,500 at Boone, Iowa, on October 31, by Rollin B. Fisher, representing the Old Colony Trust Company, Boston, Mass., in behalf of the bondholders.

INTERNATIONAL & GREAT NORTHERN.—Kingdon Gould has been made a director, succeeding his father, George J. Gould, resigned.

INTERSTATE TRANSFER RAILWAY.—This company has filed at Madison, Wis., a notice of increase of authorized stock from \$500,000 to \$1,500,000, to provide for extensions and improvements. This road runs from a point on the St. Louis river, near New Duluth, Minn., to a connection with the Northern Pacific at Pokegama, Wis., three miles.

NEW YORK, NEW HAVEN & HARTFORD.—Judge Sheldon of the Massachusetts Supreme Court on November 11 refused to issue an order restraining the company from issuing the \$67,552,000 debenture bonds recently authorized by the public service commission as sought in a bill in equity filed by former Governor Morgan G. Bulkeley of Connecticut. Judge Sheldon's ruling left to the business judgment of the railroad company the question of whether it will proceed to issue the debentures. The counsel for the road said that the refusal to restrain the issue meant that no alternative arrangement would be necessary to provide for the road's \$40,000,000 notes maturing on December 1. It was announced that Judge Sheldon would sit next Monday at the hearing on the bill in equity appealing from the decision of the commission, and to consider the case on its merits. He is expected to refer the case to the full bench for a hearing. It was said that probably there would be no actual presentation of the case before the first week in December. The directors of the company had a special meeting at New York on November 11, and voted to extend the subscription date of the \$67,552,000 bond issue from November 15 to November 26, when 65 per cent. payment is to be made.

ST. LOUIS & SAN FRANCISCO.—On November 10 the new board of directors was chosen as follows: Thomas H. West, W. K. Bixby, Albert T. Perkins, S. W. Fordyce, W. C. Nixon, W. B. Biddle, James Campbell, Festus J. Wade and Alexander Douglas, all of St. Louis; H. H. Pierce, John T. Harris and B. F. Yoakum, all of New York; and Benjamin P. Cheney of Boston.

NEW CENTRAL RAILWAY STATION AT WARSAW, RUSSIA.—Since Minister Ruchlow's recent visit to Warsaw, the Russian Ministry of Communication is greatly in favor of building at Warsaw a central station which would unite those of the Warsaw-Vienna and the Kalisz railroads. The Ministry of Communications is endeavoring to have \$1,000,000 assigned for carrying out the improvement.

NEW LINES FOR INDIA.—The Indian Railway Board is considering a scheme for constructing some 400 miles of 2 ft. 6 in. gage feeder railways all connected together in the Montgomery, Lyallpur, Sargodha and Gujrat districts of the Punjab, to serve the canal colonies. Surveys have already been carried out in two directions from Changa Manga, between Lahore and Multan, on the North Western main line.

STEAM AND ELECTRIC LOCOMOTIVES.—From the information offered by many writers on the subject, one would be led to believe that a steam locomotive is a most wasteful machine and that tremendous savings would result from abandoning their use. As a matter of fact, the performance of the locomotive boiler compares favorably with the average results obtained in stationary practice, and the performance of the complete locomotive, of modern construction, is sufficiently efficient to permit of obtaining a coal rate of 2.1 lbs. per indicator horse power hour, or 2.5 lbs. of coal per horse power hour delivered at the drawbar of the tender. Surely such results do not warrant the almost general belief that the locomotive is an inefficient machine for the purpose for which it is intended.—D. F. Crawford before the International Society for the Prevention of Smoke.